entuity
Taking the Work out of Network Management

Entuity® 16.5

Entuity Getting Started Guide

Entuity was founded to develop intelligent network management solutions. Entuity delivers the best value in infrastructure and network management by integrating into a single solution Performance Management, Availability Management and Resource Management.

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Entuity

Contents

Figures

Tables

1 Entuity Network Management

Welcome to Entuity®, the advanced network monitoring and analysis software solution from Entuity that can be used to monitor, troubleshoot and trend heterogeneous computer networks. This guide describes the procedures for installing and configuring Entuity and for placing devices under Entuity management.

You can run the `install` and `configure` programs from the command line using a series of text-only prompts (default for Linux environments) or through a Graphical User Interface (default for Windows environments).

If you have previously read through the install and configure instructions and only require a quick reminder of the steps involved refer to *Getting Started with Entuity Overview*.

Entuity accepts no liability in the event of the instructions in the guide not being followed when the product is installed and configured.

Contents of the Getting Started Guide

Chapter	Description
Getting Started with Entuity Overview	An overview of how to download and ready the Entuity ISO image, run the install and configure programs and use Entuity to discover your network.
1 Entuity Network Management	An overview of Entuity, its system requirements and different Entuity server capabilities.
2 *Prepare for Entuity Install and Configure*	Highlights items for consideration before installing Entuity, e.g. licensing, user account privileges.
3 *Install the Entuity Server*	How to install Entuity using the GUI wizard and from the command line.
4 *Configure the Entuity Server*	How to configure Entuity using the GUI wizard and from the command line.
5 *Startup, Shutdown and Process Checking*	How to start and stop the Entuity server and check its health.
6 *Entuity Licensing*	Details the Entuity licensing models, the options available with multi-server installs and how to manage your licenses.
7 *Back Up the Entuity Data*	A summary of backup options. See the *Entuity User and System Administrator Guide* for details on backing up Entuity.
8 *Entuity Maintenance Patches*	How to access and install Entuity maintenance patches.
9 *Uninstall the Entuity Server*	Instructions on how to uninstall the Entuity server.

Table 1 Contents of Getting Started Guide

Chapter	Description
A *Entuity Configuration Checklist*	Entuity worksheet that you should complete before installing Entuity.
B *Entuity Install and Packages*	A listing of packages installed with Entuity.

Table 1 Contents of Getting Started Guide

Entuity System Requirements

The particular system requirements will vary depending upon the characteristics of the monitored infrastructure, for example the speed of the network, the type and mix of managed objects, e.g. devices, ports, applications. You should consult with Entuity Professional Services on your specific system requirements.

The following sections indicate recommended specifications for running an Entuity server managing 1000 devices and 70000 ports. Specifications are provided for servers installed to Windows, Linux and virtual machine environments, and also for end users accessing Entuity through its PC and tablet web interfaces. (For more details on Entuity server system requirements see *Entuity Server Sizing*.)

Entuity Support recommend that you install the Entuity server to a dedicated machine.

Entuity Server Linux System Requirements

The Entuity server is certified for operation on the English versions of the 64-bit variant of the Red Hat Enterprise Linux ES 6, Red Hat Enterprise Linux ES 7 and Oracle Linux 6.

The following table lists the recommended system requirements for Entuity managing 1000 devices and 70000 ports in a Linux® environment.

Attribute	Value	Attribute	Value
CPU Clock Speed	2.5GHz	Disk Capacity	120GB
No. CPUs	1	Disk Interface: Data Rate	SAS 3Gbps
Cores/CPU	12	Disk Rotational Speed	15K rpm
Intel Processor Family (or equivalent)	Xeon E5 Family	Memory	32GB

Table 2 System Requirements for Entuity installed to Linux

Entuity Server Windows System Requirements

The Entuity server is certified for operation on the English versions of the Windows Server 2008 R2, Windows Server 2008 SP2, Windows Server 2012 and Windows Server 2012 R2 64-bit platforms.

The following table lists the recommended system requirements for Entuity managing 1000 devices and 70000 ports in a Windows® environment.

Attribute	Value	Attribute	Value
CPU Clock Speed	2.5GHz	Memory	24GB
No. CPUs	1	Disk Capacity	120GB
Cores/CPU	12	Disk Interface: Data Rate	SAS 3Gbps
CPU	64-bit	Disk Rotational Speed	15K rpm
Intel Processor Family (or equivalent)	Xeon E5 Family		

Table 3 System Requirements for Entuity installed to Windows

Entuity licensing relies on the server machine having the same host identifier as its Entuity license (with central server licensing this is true of the central server only). When you install Entuity it checks the host identifier by running `hostident`. On Windows environments this requires the Windows Management Information service to be running. If the service is not running `install` would fail to complete.

Entuity Web UI System Requirements

The Entuity web UI is certified for use with Internet Explorer 10.0 or later, Firefox 38 ESR (Extended Support Release) or later and Google Chrome 46 or later releases. Your web browser must be enabled for both JavaScript, for example to allow the working of the Entuity menu structure, and cookies, for example to maintain your login status.

The greatest call on the resources of a client machine is the map. An Entuity map is drawn on the client machine, the more objects you have in the map the greater the resource required to render it. To use maps with 500 or more objects the client machine should have:

- 8GB or more of memory.
- The equivalent, or better, of an Intel 4 Cores i5 2.8 GHz processor.

Attribute	Value
Compatible browser	Internet Explorer 10.0 or later (32-bit and 64 bit) Firefox 38 or later ESR (32-bit) Google Chrome 46 or later.
JavaScript	Enabled to allow the working of the Entuity menu structure.
Language Support	Entuity includes internationalization of the top level menus and simple localization, with, in addition to English, support for Mandarin Chinese, Brazilian Portuguese, French and Spanish (Chilean).
Cookies	Enabled to maintain your login status.

Table 4 System Requirements for the Entuity Web UI

If you have SSL enabled and access the Entuity web UI using a browser without TLS (Transport Layer Security protocol) enabled then the browser will raise a TLS not enabled

type error. By default TLS1.1 and TLS1.2 are not enabled in Internet Explorer 10. You can enable TLS through the Internet Explorer 10 Internet Options settings.

Entuity Tablet System Requirements

The Entuity tablet interface is certified for use with the following combinations of hardware, operating system and browser.

Devices	O/S	Browser
iPad 4 or higher	IOS 7.0.3	Safari
iPad mini or higher	IOS 7.0.3	Safari
Nexus 7 or higher (or equivalent)	Android Jelly Bean 4.3	Chrome
Nexus 10 or higher (or equivalent)	Android Jelly Bean 4.3	Chrome
Microsoft Surface (or equivalent)	Windows 8.0	IE 10

Table 5 Certified Tablet System Combinations

Your web browser must be enabled for both JavaScript, for example to allow the working of the Entuity menu structure, and permit access to the application cache.

Attribute	Value
JavaScript	Enabled to allow the working of the Entuity menu structure.
Language Support	Entuity currently supports English.
Application Cache	Enabled to retain and maintain application details.

Table 6 System Requirements for the Entuity Tablet

Virtual Machines Certified to Host Entuity

Entuity Support recommend running Entuity only on the certified virtual machines other virtual machines, or versions of the virtual machines specified here, are not support. Entuity is certified to run in these virtual machine environments, on both Windows and Linux operating systems:

- Citrix XenCenter 5.1, 6.0
- Microsoft HyperV 6.1
- Oracle VirtualBox 4.3
- Oracle VM Server 2.2, 3.*x*
- VMware ESX 3.0
- VMware ESXi 4.*x*
- VMware ESXi 5.*x*
- VMware Workstation 7.*x*, 8.*x*, 9.*x*.

Entuity can be deployed to major public cloud providers, e.g. AWS Cloud, when the operating system environment conforms to a supported environment.

Sizing of Virtual Machines

When allocating resources to a VM on which it is planned to run Entuity, it is essential that CPU, memory and disk space allocations reflect the Entuity recommendations for an equivalent dedicated server. Any reduction of these resources below the recommended minimum specification can make the system liable to performance problems, and such configurations will not be supported by Entuity.

Configuration of Virtual Machines on the Host Server

When configuring a VM for Entuity, it is important to remember that Entuity is a real-time system which must operate continuously to be effective. It is therefore essential that sufficient resources are dedicated to each VM in which Entuity is to run. Failure to do this may result in data loss, thereby compromising the integrity of Entuity's real-time alerting system and its historical database.

Entuity Server Roles

When you run `configure` you can set the server capability, this sets the potential roles available to that Entuity server. When installing multiple Entuity servers to manage your network, you can configure them with different capabilities and assign them specific roles to deliver the best server performance. You can view information collected by more than one server by using a server as a consolidation server; a server that does not manage or poll devices but can access the information collected by its remote servers.

Entuity can also integrate with SurePath, for example:

- A SurePath server can include multiple Entuity remote servers and use their inventory when discovering paths.
- An Entuity consolidation server can include as remote servers the SurePath server and all of its remote servers. Entuity users can then monitor and administrators manage paths.

Entuity Server as a Polling Engine and Flow Collector

Entuity can act as a polling engine, e.g. managing inventory, monitoring faults, performance and availability, with multi-server consolidation, reports, event management. The Entuity Integrated Flow Analyzer flow collection capability is disabled for the server, however it can display flow data collected by remote flow collectors and servers.

Flow collection can be a resource intensive process and may, where the server manages many devices, interfere with the performance of the polling engine. You should consult with your Entuity representative on server requirements.

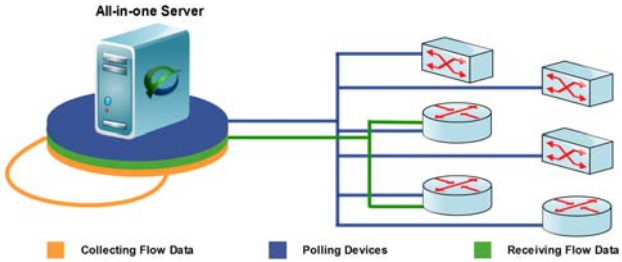

Figure 1 Entuity Server Polling and Flow Collecting

Entuity Server as a Polling Engine

The polling engine is the set of processes within an Entuity server responsible for all general network management tasks (e.g. network discovery, inventory, monitoring, event management) excluding flow collection.

An Entuity server that is set up as only a polling engine can still handle flow data by having Entuity Flow Collectors assigned to it. The resource intensive process of collecting flow data is handled on a separate machine, preventing it impacting Entuity polling.

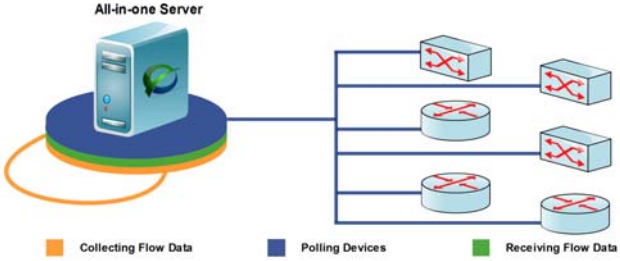

Figure 2 All-in-one Server Polling Only

Entuity Server as a Consolidation Server

A consolidation server does not poll or collect flow data but provides access to the data of the remote Entuity servers assigned to it. Without devices or flows under its own management you use it only to view and report on information collected by its remote servers. In this way you separate the load placed on a server from polling and collecting network data, from the load placed on a server by viewing and reporting on the collected network data.

From the consolidation server you can also assign remote SurePath servers and access their paths.

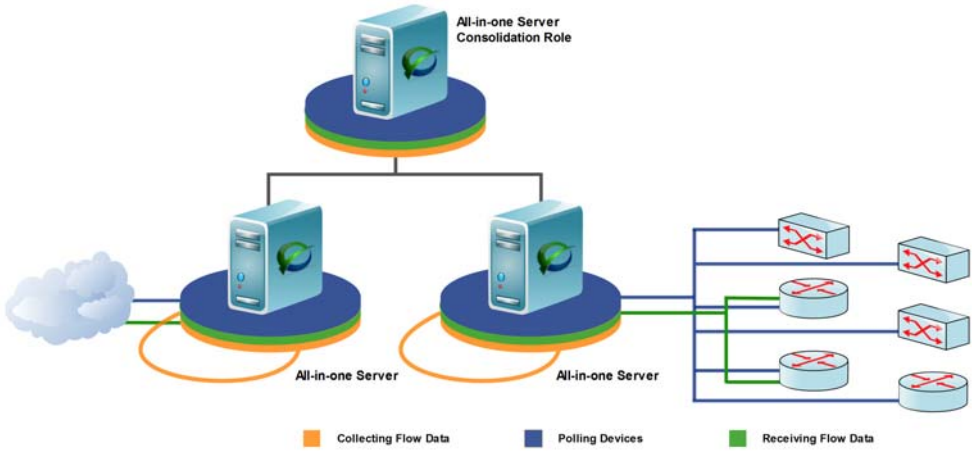

Figure 3 All-in-one Server as a Consolidation Server

Entuity as Only a Flow Collector

Integrated Flow Collector is the set of processes within an Entuity server responsible for the receiving, processing and storage of flow records. Entuity recommend flow collection is undertaken by a dedicated flow collector. The collected flow data is accessed through a second Entuity server to which the flow collector is assigned.

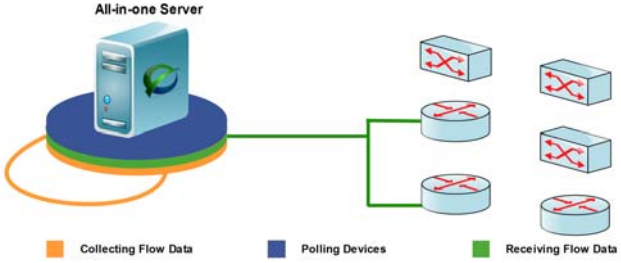

Figure 4 All-in-one Server Only Collecting Flow Data

Entuity Security and User Authentication

Entuity's high levels of security and authentication ensure that all sensitive asset information is safe, this is achieved through:

- Implementation of Secure Socket Layer (SSL).
- Explicit log files for Entuity login attempts.

The flexible nature of the Entuity architecture enables the interface and access privileges to be deployed at a very granular level. Entuity User Authentication simplifies the credential burden for both users and administrators by allowing users to sign on once to an Entuity server and then have access to its remote servers. Entuity User Authentication also utilizes

external authentication data stores and by using the preferred corporate authentication credentials, Entuity helps network administrators follow company compliance policies.

Entuity User Authentication currently supports:

- Internal user authentication.
- External authentication through LDAP and Active Directory authentication servers.
- Sign on one Entuity server and access its remote servers, easing the credential burden for both users and administrators.
- User preference storage.
- Assignment of users to Entuity user groups, through which Entuity sets user permissions.

For more detail on Entuity User Authentication see the *Entuity User and System Administrator Guide*.

When is Entuity Ready To Use?

After Entuity installation and configuration you must start the Entuity server.

When you have a distributed licensing model with a Central License Server you must allocate license credits to it and its remote servers before they can manage devices. When the Entuity server has a standalone license its license credits are automatically allocated.

When a server has a:

- Polling role you can add devices to the Entuity server through the **Administration > Inventory** / **Topology** page.

  As soon as you add devices you can start to use Entuity although it may take some time to fully discover all device attributes and some features, for example some reports may require at least 24 hours of data.

- Flow collector role, complete the flow data collection setup.

Validate Network Data

You should always be aware that Entuity collects data from devices it manages, sometimes data that has default factory, or incorrectly configured, settings. Entuity still collects and uses that data regardless. Within Entuity you can override values, e.g. port speed, however the more you validate your device settings the better Entuity can manage your network.

Integration with Entuity SurePath

SurePath discovers the actual path an application takes between two endpoints in a network. It provides live path topology and status, tracks path history and alerts on path changes in real time. The Entuity integration with SurePath allows you to:

- Use a central Entuity server to manage one remote SurePath server.
- Log into the Entuity server and access all SurePath pages. This can allow you to benefit from your Entuity setup, for example consolidated user interface, LDAP authentication.

- Place SurePath discovered paths into Entuity defined views.
- View paths in the Explorer tree.
- Highlight managed objects in a map that are part of a specified path.
- Create a path from the results of an Integrated Flow Analyzer analysis using Top Conversations.
- Place paths into services for higher service-level monitoring.

Modules and Integrations Available with Entuity

Entuity modules and integrations are included with the Entuity image but are separately licensed and are not activated by default.

Entuity Enterprise Modules	
Entuity BladeCenter	Entuity Load Balancer
Entuity Cisco Unified Communications Manager	Entuity High Availability Compatibility
Entuity Cisco SSL Services	Entuity MPLS
Entuity Cisco IP SLA	Entuity QoS
Entuity Configuration Monitor	Entuity Routing Protocols Extension
Entuity Data Export	Entuity VPN Gateway
Entuity Firewall	Entuity Wide Area Application Services Support
Entuity IPv6	Entuity Wireless

Table 7 Entuity Modules

Entuity Enterprise Integration Modules
Entuity Integration Module for BMC Remedy AR System
Entuity Integration Module for BMC Atrium
Entuity Integration Module for NetView Foundation
Network Management Plug-in for Oracle Enterprise Manager

Table 8 Entuity Integration Modules

2 Prepare for Entuity Install and Configure

To successfully run Entuity:

1) Prepare by following the guidance in this chapter.
2) Obtain an Entuity license. You can only use the evaluation license shipped with the product for a maximum of thirty days. (See *Chapter 6 - Entuity Licensing*.)

   You must provide to your Entuity supplier the host identifier of the machine to which you want to install Entuity.
3) Prepare the ISO image:
   - Download the compressed software and decompress it to an empty folder.
   - Use third party software to mount or burn the ISO image.
4) Install Entuity.
5) Configure Entuity.
6) Start Entuity.
7) Log into Entuity.

   Entuity displays the Inventory page through which you can add devices to Entuity.

When upgrading Entuity you should back it up before starting the upgrade. You should also backup Entuity after upgrading Entuity, so you have a clear restore point.

Prepare for Entuity

Installing and configuring Entuity is a straightforward process, that you can make easier through careful preparation. The following actions are advised:

- Understand how you want Entuity to manage your network. Where you are installing more than one Entuity server you may want to assign servers different roles, e.g. dedicated flow collector, poller, consolidation server.
- Ensure that the machine you are installing to meets your requirements, these may vary according to the server's role. Consult with your Entuity representative.
- Install Entuity to its own machine, sharing a machine with other resource intensive software may lead to performance issues. Similarly you should disable:
  - Automatic upgrades that could interfere with server performance and availability, e.g. Windows Automatic Update can cause a PC reboot.
  - Anti-virus software from scanning the database directories. Anti-virus software can disrupt the performance of the database, potentially resulting in its corruption.
- Check the firewall on the machine permits running of the:
  - ICMP ping application. For example in Windows firewalls you may have to enable the

Echo Request inbound rules.

- `objectStatusCGI` executable as it handles the ICMP state of the device. When the executable is blocked Entuity reports the devices as unreachable.

- Install Entuity to a machine with a static IP address.
- Ensure that you have the appropriate tools, e.g. compression and ISO image software, and disk space for downloading and installing from an electronic distribution. (See *Preparing to Install Entuity*.)
- Obtain from your supplier of Entuity a valid license file, the shipped evaluation license is only valid for thirty days. In Windows and Linux environments you must provide the machine's host identifier. (See *Chapter 6 - Entuity Licensing*.)
- Complete the configuration worksheet which will help you answer the prompts during configuration. (See *A - Entuity Configuration Checklist*.)
- Ensure that the Entuity server is on any required firewall access list. For example, Entuity requires firewalls configured to allow it SNMP and ICMP polling access to your network.
- Ensure that any security modules have the correct policies for the Entuity server. For example, not configuring SELinux to permit Entuity to use SSL port 443 could result in the shutdown of the Entuity web server were Entuity to be configured to use SSL.
- If you want to use Entuity as an SNMP trap recipient, ensure that SNMP traps are directed at the Entuity server (it is not necessary to use any specific trap community string - **public** is the default). Typical SNMP traps from devices are: **linkUp**, **linkDown**, **coldStart**, **warmStart** and **spanningTreeNewRoot**.

Entuity recommend that **linkUp** and **linkDown** traps are configured on all interfaces on all devices. This provides maximum port event visibility.

- Check that the default TCP ports Entuity uses do not conflict with your current environment. You can amend these defaults during the Entuity configuration but it is recommended that the default settings are retained, when possible.

Port	Purpose
80	Web server port for access to Entuity. You must specify a different web server port if you already have another web server on port 80.
443	Web server port for access to Entuity when using SSL. You must specify a different web server port if you already have another web server on port 443.
3306	Port number on which the database server, mysqld, listens.
19193	Event Request Listener IP port on which you want the event management process to listen for incoming requests for events.
19194	Event Receiver IP port on which you want the event management process to listen for incoming requests for events.
20202	The default port on which the Ticker server listens for client activity.

Table 9 Default Port Settings

Port	Purpose
8080	Tomcat Server Port.
8005	Tomcat Server Administration Port.
9996	Flow port on which Entuity IFA receives flow information from devices sending NetFlow, Netstream or JFlow packets. This flow collector port is configurable through `configure` and `flowcfg.properties`. Entuity IFA collects IPFIX flow data on port 2055 and sFlow data on port 6343. These collector ports are not configurable, you must therefore ensure routers are configured to send flow data to the appropriate ports otherwise Entuity IFA will not recognize and collect the data.
12121	Flow Management port used to manage, e.g. stop, the Flow Collector process.

Table 9 Default Port Settings

Install and Configure Login Privilege Requirements

Entuity `install` and `configure` require privileged (e.g. root, administrator) access. You should therefore log in appropriately before running Entuity `install` and `configure`. The installation and configuration processes can then create the required directories, set up ownerships for processes that need special privileges and in Windows configure Windows Services. For example the webserver if left on the default TCP port 80 and the trap daemon requires UDP port 162, on which only root processes can listen.

In Linux environments during `configure` you can assign a user permission to stop and start Entuity.

Following installation, privileged access is not necessary to run Entuity because processes requiring such access will have been accorded the required permissions during installation.

High Speed Port Utilization and Traffic Polling

RFC 2863 requires interfaces that operate above 20 Mbps to support 64 bit counters; SNMP agents that support 64 bit counters are available from SNMPv2 onwards. However, Entuity's `eyepoller` can successfully poll ports with a speed of 105Mbps or below using polling of 32 bit counters. For `eyepoller` to collect traffic and utilization data for ports with a speed above 105Mbps there must be accompanying 64 bit counter support in the device's SNMP agent.

Entuity recommend checking devices for installation of SNMP agents that support 64 bit counters. For example you can test a device's 64 bit counter support using *entuity_home*`\lib\tools\snmpwalk`:

```
snmpwalk –v2c -c <community> <device> .1.3.6.1.2.1.31.1.1.1.6
```

`eyepoller` uses a number of 64 bit counters including IF-MIB::ifHCInOctets.

For managed hosts, where a device's agent does not support 64 bit counters you should consider upgrading the agent. Alternatively, for example, you may be able to monitor a port's outbound utilization and traffic data from the receiving interface, or inbound utilization and traffic data from the sending interface.

Supported SNMP Versions

Entuity Support recommend Entuity manages devices that have enabled an SNMPv3 agent, an SNMPv2c agent or both SNMPv1 and SNMPv2c (SNMPv1/v2c) agents. Entuity can manage devices that are only enabled for SNMPv1, however the level of management is restricted by SNMPv1, for example 64 bit counter support is only available with SNMPv2 onwards, and this support is required for `eyepoller` to successfully poll interfaces with a speed above 105Mbps.

Support for SNMPv3 Engine Identifiers

SNMPv3 devices have an engine identifier which is used when polling the device and for determining the source of a trap. Devices with duplicate engineIDs are not compliant with the SNMPv3 standard. However, some manufacturers do repeat engineIDs and Entuity supports this behavior:

1) Entuity checks that the SNMPv3 agent of all of the devices it takes under management have unique engine identifiers.
2) Entuity adds devices with the same engine identifier as ones already under its management.
3) If devices have duplicate engineIDs Entuity raises SNMP v3 Duplicate Engine ID events and incidents.
4) If Entuity manages an SNMPv3 device that is reconfigured with an engine identifier already used by another device also managed by that server Entuity raises an SNMP v3 Duplicate Engine ID event.
5) The SNMP v3 Duplicate Engine ID event indicates that two or more devices under management now have the same SNMPv3 engine identifier. You should consider reconfiguring one of the devices with a new unique engine identifier.

SSL Requirements

When using SSL you must decide who will authorize your SSL certificates. Many companies specialize in this and they will guide you through the certificate generation process. There are also utilities, not supplied with Entuity, that allow you to generate your own SSL files.

However the files are created, you first generate a Certificate Signing Request (CSR) using Apache Mod_SSL/OpenSSL (consult the Apache documentation for details). This process creates the:

- SSL Private Key that you must keep safe.
- CSR that must be authorized. There are two approaches to authorization:
  - Through a Certificating Authority. This is a recognized authority which provides you with a CA certificate, the more established authorities are trusted by internet browsers, Apache server, Apache Tomcat. You can then generate SSL certificates which are authenticated as they reference the CA certificate.
  - You become your own certificating authority. The first time a user accesses Entuity

through a browser they are warned that the authority is unknown. Users can add the certificate to their list of trusted certificates.

The authority generates from the CSR the SSL certificate.

Once the SSL file creation process is complete you can include these files during Entuity configuration:

- SSL Certificate.
- SSL Private Key.
- SSL CA Certificate is only required when you are using a Certificating Authority to authenticate your SSL certificates. Do not use this option empty when using self certified certificates as it may prevent Entuity from running.

  The CA certificate is issued by certificating authorities, the larger authorities are recognized by your browser. CA certificates act as the root certificate, from which you can generate SSL Certificates.

  When a browser connects to Entuity and it recognizes the certificating authority, the user can access Entuity. When the authority is not recognized Entuity checks the validity of the CA certificate; for:

  - A valid certificate Entuity prompts you to add the certificate to the browser's list of trusted root certificates.
  - An invalid certificate Entuity server runs but `httpd` does not.

Entuity recommends the SSL Certificate, SSL Private Key and SSL CA Certificate files are installed to *entuity_home*`\etc`.

When the Entuity server starts it checks the SSL files are of the expected format. If they are for example, corrupt or if there is an CA certificate and it is from a unrecognized authority Entuity will not start.

Operating System Environment Specific Considerations

Entuity is certified to run in Windows and Linux environments. The following sections identify operating system configurations either required for Entuity to run, or recommended to improve its performance:

- *Linux Packages Required for Entuity*
- *Linux Maximum Number of Processes per Non-Root User*
- *Linux Name Service Cache Daemon*
- *Linux Server Time Zones*
- *Linux Arena Allocation Configuration*
- *Linux Shared Library Loader*
- *Windows Maximum Port Usage Requirements*
- *Windows Firewall Requires Port Registration*
- *Windows and IPv6 Support*.

Linux Packages Required for Entuity

When installing Entuity to Red Hat Linux 6 or Oracle Linux 6 Entuity requires that a particular set of 64-bit packages are already installed, see *Table 10 Additional Packages Required for Entuity*.

Linux Packages			
alsa-lib.x86_64	glibc.x86_64	libaio.x86_64	libgcc.x86_64
libgcrypt.x86_64	libgpg-error.x86_64	libICE.x86_64	libSM.x86_64
libstdc++.x86_64	libuuid.x86_64	libX11.x86_64	libXau.x86_64
libxcb.x86_64	libXext.x86_64	libXi.x86_64	libxml2.x86_64
libxslt.x86_64	libXtst.x86_64	libXt.x86_64	ncurses-libs.x86_64
nss-softokn-freebl.x86_64	rpcbind.x86_64	zlib.x86_64	

Table 10 Additional Packages Required for Entuity

When running any of the BMC integrations shipped with Entuity there are an additional four 32-bit required packages, see *Table 11 Additional Packages for Entuity BMC Integrations*.

Linux Packages Required with BMC Integrations			
compat-libstdc++-33.i686	glibc.i686	nss-softokn-freebl.i686	libgcc.i686

Table 11 Additional Packages for Entuity BMC Integrations

Check for Required Packages

To check if a package is installed, from the server command line you can use the RPM Package Manager (RPM). For example port mapper must be installed and running for Entuity to use unassigned ports for its internal communication, e.g. with its licensing functions.

To check if the `rpcbind.x86_64` package is installed, from the server command line enter:

```
rpm –q rpcbind.x86_64
```

When the package is:

- Not installed RPM returns:
  `rpcbind.x86_64 is not installed`
- Installed RPM returns full details of the package, for example:
  `rpcbind-0.2.0-9.el6.x86_64`

You can also check all of the packages through one instruction. The following example:

- Does not include the packages required for the BMC integrations.
- Can be copied and pasted to the command line as it includes the multi-line indicator \ .

```
for i in alsa-lib.x86_64 glibc.x86_64 libaio.x86_64 libgcc.x86_64 \
libgcrypt.x86_64 libgpg-error.x86_64 libICE.x86_64 libSM.x86_64 \
libstdc++.x86_64 libuuid.x86_64 libX11.x86_64 libXau.x86_64 \
```

```
libxcb.x86_64 libXext.x86_64 libXi.x86_64 libxml2.x86_64 \
libxslt.x86_64 libXtst.x86_64 libXt.x86_64 ncurses-libs.x86_64 \
nss-softokn-freebl.x86_64 rpcbind.x86_64 zlib.x86_64; \
do rpm –q $i ;done
```

Install Missing Required Packages

You should consult the Linux documentation before installing the missing required packages.

You must install any missing packages to the server before installing Entuity:

- Red Hat Linux users must register their system with Red Hat Network to receive updates.
- Oracle Linux users can obtain the required packages from Oracle Public Yum Server.

You can use the command line package utility Yellowdog Updater, Modified (YUM) to install missing packages. You can install all packages through one instruction. The following example:

- Does not include the packages required for the BMC integrations.
- Can be copied and pasted to the command line as it includes the multi-line indicator \ .

```
yum install alsa-lib.x86_64 glibc.x86_64 libaio.x86_64 libgcc.x86_64 \
libgcrypt.x86_64 libgpg-error.x86_64 libICE.x86_64 libSM.x86_64 \
libstdc++.x86_64 libuuid.x86_64 libX11.x86_64 libXau.x86_64 \
libxcb.x86_64 libXext.x86_64 libXi.x86_64 libxml2.x86_64 \
libxslt.x86_64 libXtst.x86_64 libXt.x86_64 ncurses-libs.x86_64 \
nss-softokn-freebl.x86_64 rpcbind.x86_64 zlib.x86_64
```

rpcbind Service

The rpcbind package is the Linux RPC port mapper. Entuity uses the portmap (`rpc.portmap`, `portmap` or `rpcbind`) service to obtain unused ports for its internal communications, for example the licensing functions cannot run without access to available ports and therefore Entuity cannot run.

After confirming the presence of, or installing the `rpcbind` package you should check that the `rpcbind` service is running; by default `rpcbind` only starts when the server boots up.

To check if `rpcbind` is running enter:

```
service rpcbind status
```

- When the service is not running Linux returns:

```
rpcbind is stopped
```

- When the service is running Linux returns:

```
rpcbind (pid nnn) is running ...
```

To start `rpcbind` enter:

```
service rpcbind start
```

You should also ensure it is started every time the server starts:

```
chkconfig rpcbind on
```

Linux Maximum Number of Processes per Non-Root User

You can run Entuity using a non-root user account, however Red Hat Linux 6 and Oracle Linux 6 default the maximum number of processes per non-root user to 1024. Entuity requires a higher limit; a recommended value of 4096.

From the server command line you can run `ulimit` to check the current value of max user processes:

```
ulimit -a
```

To set the maximum number of processes per non-root user:

1) From `/etc/security/limits.d/90-nproc.conf` amend the `soft nproc` value to 4096 :

```
* soft nproc 4096
```

2) After you amend the parameter restart the Linux server to apply the change.

3) From the server command line you can run `ulimit` to check the value of max user processes is now set to 4096.

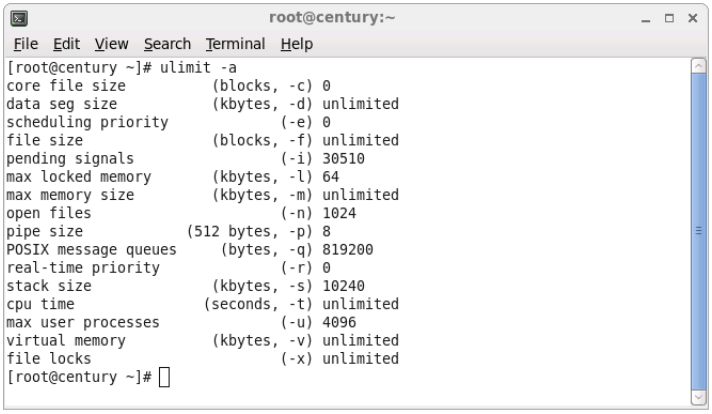

Figure 5 Check Maximum Number of User Processes

Linux Name Service Cache Daemon

Entuity Support recommend `nscd` (Name Service Cache Daemon) is running on the Entuity server. `nscd` maintains caches for passwd, group and, most importantly for Entuity performance, host lookups.

In Linux Red Hat and Oracle Linux you may have to install and configure the `nscd` service.

To check if the package `nscd.x86_64` is installed, from the server command line enter:

```
rpm –q nscd.x86_64
```

You can use YUM to install the package:

```
yum install nscd.x86_64
```

Once installed, edit `/etc/sysconfig/nscd.conf` to enable cache hosting:

```
enable-cache hosts yes
```

Once it is installed start the service:

```
service nscd start
```

You should also ensure it is started every time the server starts:

```
chkconfig nscd on
```

Linux Server Time Zones

When the TZ environment variable is not set on Linux servers, the servers use the default time zone, GMT. When GMT is not the server's time zone this causes data synchronization problems in certain reports. For example running a report in EST to show port utilization of switches from 07:00-19:00 the report would actually cover from 11:00-23:00.

Linux Arena Allocation Configuration

By default Entuity limits the total number of arenas its threads can use on its server to 16. On servers with many cores this prevents Entuity, from an administrator's perspective, allocating itself an unexpectedly large memory resource. Linux arenas are allocated memory in, as a minimum, 64mb chunks.

When you have available memory, you can improve Entuity performance by allocating more memory resource. The limit on the number of arenas associated with Entuity is set in `entuity.cfg`, through `mallocArenaMax`. For example to double the number of arenas specify:

```
mallocArenaMax=32
```

You should consult with your Linux administrator when calculating the number of arenas to permit to Entuity.

Linux Shared Library Loader

If you configure Entuity to run as a non root user then the shared library loader will not expand relative paths to find shared libraries for setUID programs as this would be a security risk. `configure`:

1) Creates, or updates, *entuity_home*`/etc/ld.so.conf.d/Entuity-x86_64.conf` with the path `$ENTUITY_HOME/lib`.
2) Runs `/sbin/ldconfig` to update the shared library cache.

You should set up the Operating System's shared library cache so that the setUID executables that are run from the command line can use the mariaDB shared library.

Windows Maximum Port Usage Requirements

The Entuity server continually uses and releases sockets, for example when running `prole`. These sockets once released only become free again after a time-out period. When running the Entuity server in a Windows environment and monitoring large networks the default maximum number of ports maybe reached. Without available sockets Entuity performance is severely impacted. For example the creation of new `prole` processes is prevented and so data collection becomes unreliable.

In Windows, Entuity recommend the registry key value *MaxUserPort* is set to 0x0000FFFE (65534). Entuity `configure` checks the current value of *MaxUserPort*, and when it is not set to the maximum value, prompts you to authorize `configure` to amend it. Alternatively you can ignore the prompt, and could manually edit *MaxUserPort* value, setting:

- *Key*: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters
- *Type*: REG_DWORD
- *Value*: 0x000fffe (65534).

Care should always be taken when changing your system registry.

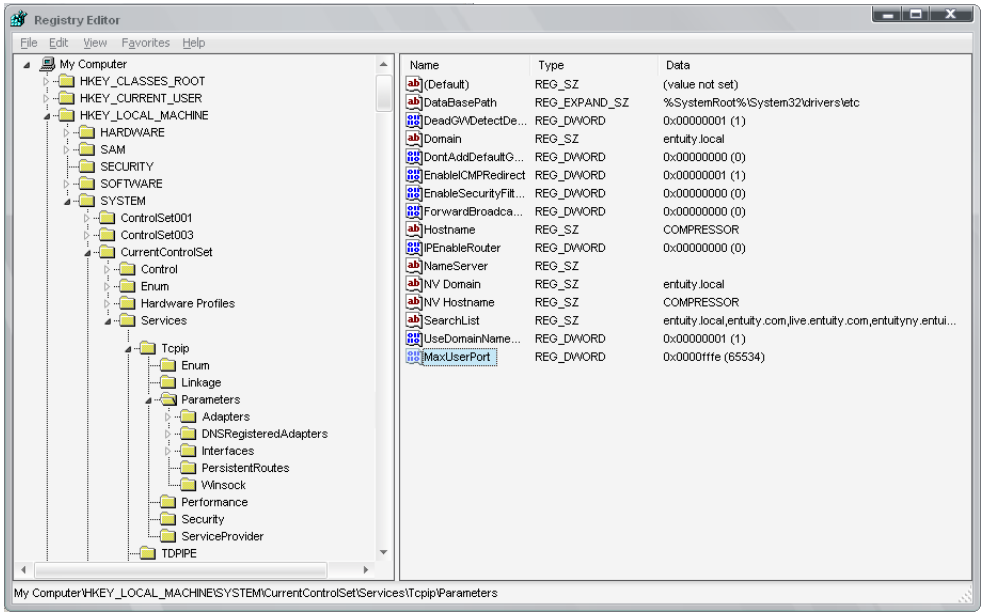

Figure 6 Windows System Registry

Windows Firewall Requires Port Registration

The Windows Firewall identifies listening ports on the Entuity server as possible security risks. This impacts Entuity in two ways:

- During Entuity configuration the firewall displays a warning message about the Java process. Clicking on the Unblock option allows Entuity configuration to safely continue.
- Before starting the Entuity server you must register the ports that the server uses to communicate with the network devices and third party software.

  You should also configure a firewall custom rule, to allow through all inbound ICMP traffic to the Entuity server; inbound ICMP traffic is used by `applicationMonitor` and `autoDiscovery` processes.

  Registration is completed by opening from the Control Panel the Windows Firewall function and then viewing the Exceptions tab. Register each port as an exception.

Windows and IPv6 Support

For Entuity to monitor devices using the IPv6 protocol, support for this protocol must be enabled on the Entuity server machine. In Linux environments this is usually enabled by default but in Windows you may have to install it yourself, for example from the command line enter:

```
ipv6 install
```

3 Install the Entuity Server

Before installing Entuity ensure you have read and understood the requirements detailed in *Chapter 2 - Prepare for Entuity Install and Configure* and checked that all other applications are shut down, including any other installations of Entuity.

Through `install` you:

- Accept the Entuity license agreement.
- Specify the Entuity install folders.
- Review a Summary page before starting the Entuity installation.
- Can continue the installation process and configure Entuity.

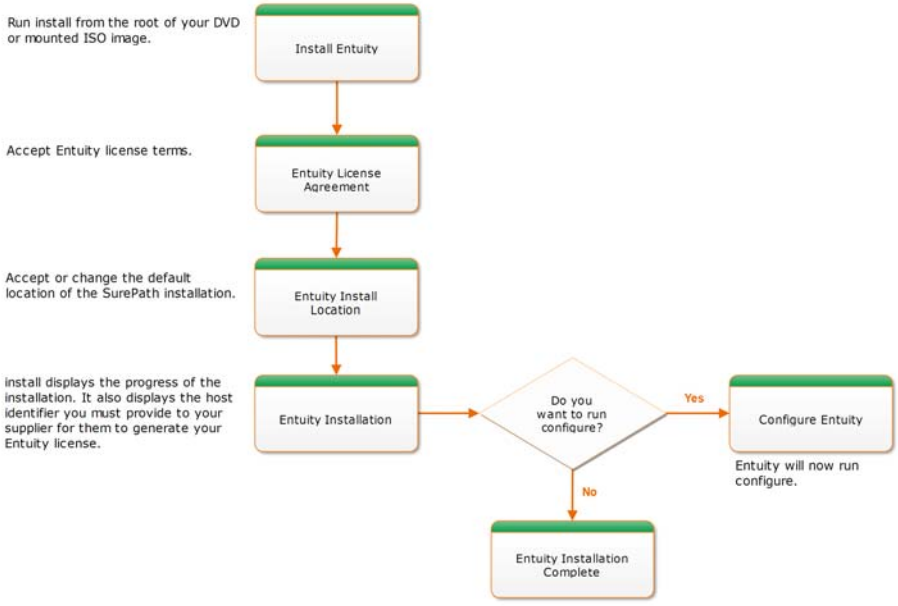

Figure 7 Entuity Install Process

You can run the `install` program from the command line using a series of text-only prompts (default for Linux environments) or through a Graphical User Interface (default for Windows environments).

Installing Entuity Using the Install Wizard

The Entuity Install wizard is actioned through a Java based installer. The Java installation is included with the software and does not overwrite any previous Java installation on your system. A series of screens guide you through the installation, online help is available by

clicking on **Help**. You can also use **Back** and **Next** to move backwards and forwards through the installation process.

Through the installation wizards the buttons present standard functionality. Click:

- **Next** to display the next window.
- **Back** to display the previous window.
- **Help** to display context sensitive help.
- **Cancel** to cancel the install.
- **Browse** to open a dialog to browse through the directory structure.

Entuity is distributed as a compressed DVD ISO image. You must mount or burn the ISO image before Entuity can be installed. (See *Preparing to Install Entuity*.)

Installing the Entuity server to a Linux environment is by default from the command line, however you can call the GUI interface by from the command line entering:

```
./install gui
```

To install Entuity:

1) Run `install` and use the GUI install wizard. `install` is available at the root of the Entuity software:

   - In Linux environments enter:

   ```
   ./install gui
   ```

   - In Windows environments enter:

   ```
   install
   ```

   - In Windows environments click **Start > Run**, from the Run dialog browse for the `image` root and select `install`.

   `install` starts the Entuity Server Install wizard, displaying the Welcome page. Read the Installation Welcome screen and then click **Next**.

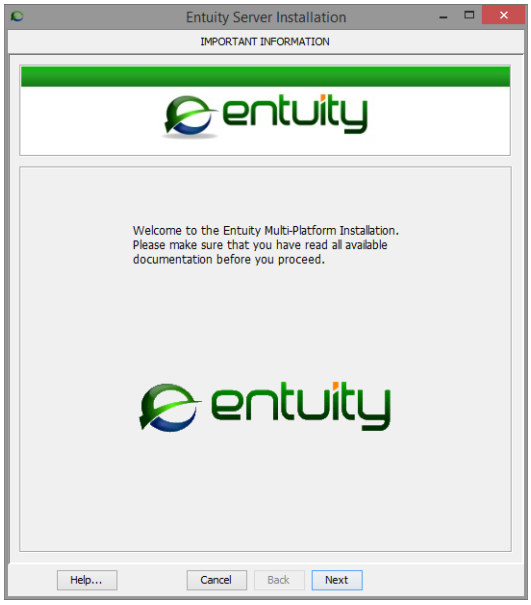

Figure 8 Entuity Install Welcome Screen

2) `install` displays the Entuity license agreement. Read the license agreement.

   Click **Agree** and **Next** to install Entuity.

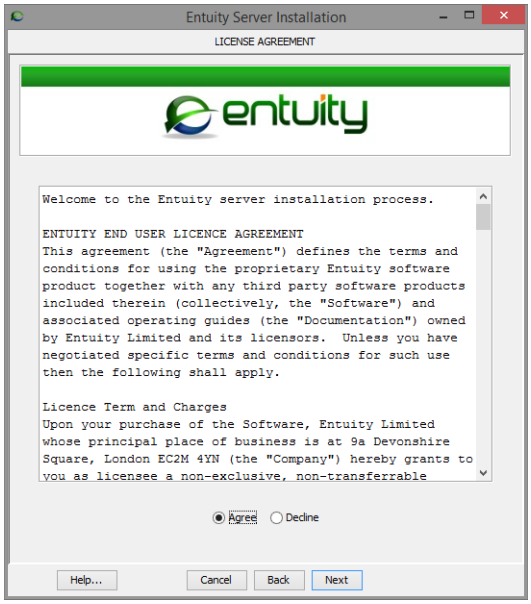

Figure 9 Entuity License Agreement

3) `install` displays the Installation Location page.

   By default, Entuity is installed to `C:\Entuity`. You can install to an alternative location but the directory structure must not include spaces.

   Once you have defined the destination, click on **Next**. If the folder:

   - Exists, `install` warns you the software is already installed and prompts you to confirm that you want to overwrite (**Yes**) the previous installation, or not (**No**). When you confirm it can be overwritten, `install` then prompts you to preserve the existing data (**Yes**), or delete the existing data (**No**) although backups are preserved.
   - Does not exist, `install` prompts you to confirm the creation of the install folder.

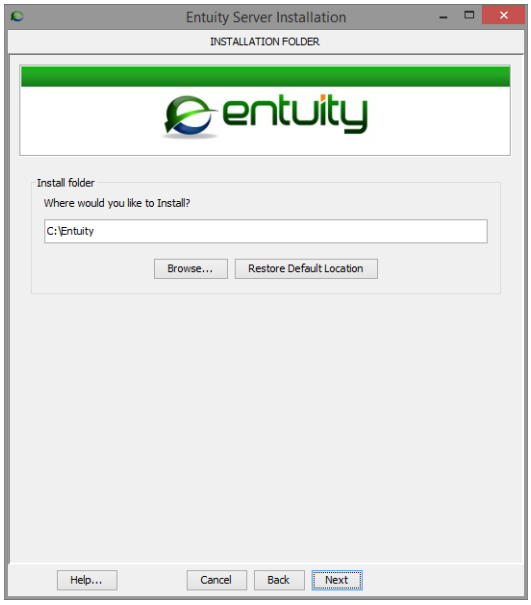

Figure 10 Set the Entuity Install Folder

4) `install` displays an installation progress screen and finally whether the installation has successfully completed. If the installation:

   - Failed check the displayed messages. You can find the install log file in `c:\Documents and Settings\UserName\Local Settings\temp\EYEInstall.log`.
   - Succeeded Entuity displays the host identifier of the server machine. When you want to purchase a license you must provide this identifier to your Entuity supplier. However, you can configure and then run Entuity using the thirty day evaluation license shipped with Entuity.

Entuity checks the host identifier by running `hostident`. On Windows environments this requires the Windows Management Information service to be running. If the service is not running `install` would fail to complete.

After a successful installation you can continue and immediately run `configure`. You can also separately run `configure`.

When `install` and then `configure` successfully complete, `configure` copies their log files, `EYEInstall.log` and `EYEConfigure.log`, to the Entuity log folder.

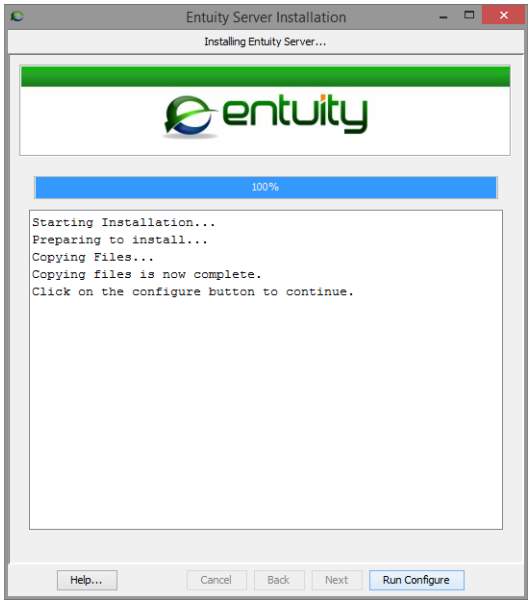

Figure 11 Install Completion Including Host Identifier

Installing Entuity from the Command Line

By default Entuity is installed on Linux systems from the command line. In Windows environments by default `install` runs through a wizard, however you can also run `install` from the command line.

A series of prompts guide you through the installation. Press **<Return>** to enter each command, default values are displayed in the prompt, within brackets, e.g.:

```
Proceed [no]>
```

To exit the install enter **q** and press **<Return>**.

To install Entuity:

1) Run `install` from the command line. `install` is available at the root of the Entuity software:

   - In Linux environments enter:

     `./install`

   - In Windows environments enter:

     `install text`

     `install` displays the welcome and copyright messages.

2) `install` prompts for you to accept the license terms and proceed:

```
Proceed? [no]>
```

Enter **Y** to proceed.

3) `install` prompts you for the **Destination directory**, by default `/Entuity`. It is the directory to which Entuity is installed, referred to in the documentation as *entuity_home*.

   You can enter a different destination, including one that does not exist as `install` should be run with a user account with permissions to create folders. The destination location name must not include spaces.

   If the specified directory:

   - Exists and does not contain a previous Entuity installation then, provided that the name is valid, `install` continues from step 6).
   - Exists and Entuity was previously installed to it, `install` prompts you to confirm that you want to proceed. If you answer **n**, you are returned to step 3). If you answer **y** `install` continues from step 4).
   - Does not exist, `install` prompts you to confirm that you want to create the named directory. If you answer **n**, you are returned to step 3). If you answer **y**, `install` creates the directory and `install` continues from step 4).

4) `install` prompts you to confirm that you want to proceed:

   ```
   The software is already installed
   Do you want to continue? [no]
   ```

   If you answer:

   - **n** `install` raises a log file, displays its location and quits the installation.
   - **y** `install` continues from step 5).

5) `Install` checks whether you want to keep the existing database:

   ```
   Do you want to preserve the existing data?
   If you answer NO the existing working data will be completely removed.
   Note that the database backup directory will be preserved.
   Preserve existing data? [yes]
   ```

6) `install` copies the Entuity server software components to the destination directory. It updates the display to report the progress of the copy.

   ```
   Do you want to preserve the existing data?
   If you answer NO the existing working data will be completely removed.
   ```

7) Once installation is complete `install` displays the host identifier of the server machine. When you want to purchase a license you must provide this identifier to your Entuity supplier. However, you can configure and then run Entuity using the thirty day evaluation license shipped with Entuity.

Entuity checks the host identifier by running `hostident`. On Windows environments this requires the Windows Management Information service to be running. If the service is not running `install` would fail to complete.

If the install fails you can find the install log file in `/tmp/EYEInstall.log`.

When `install` and then `configure` successfully complete, `configure` copies their log files, `EYEInstall.log` and `EYEConfigure.log`, to the Entuity log folder.

8) You now have the option to continue and launch `configure`.

4 Configure the Entuity Server

You can run the `configure` program from the command line using a series of text-only prompts (default for Linux environments) or through a Graphical User Interface (default for Windows environments).

Following the initial configuration of Entuity, you can run the configuration procedure as often as is required to customize your system.

Overview of the Entuity Server Configuration

Before you run Entuity `configure`:

- Ensure Entuity `install` completed successfully.
- Confirm the license meets your requirements.

  You can use the evaluation license for thirty days. For a full license contact your Entuity representative. You must then copy it to your license file location, by default *entuity_home*`\etc\license.dat`. (See *Chapter 6 - Entuity Licensing*.)
- Ensure you are aware of Entuity server firewall port registration requirements.
- Know the role of the server, i.e. Standard (polling engine), All-in-one (flow collection and polling engine).
- Know which optional modules you want to install.
- When using Entuity Configuration Monitor module ensure the TFTP or FTP server is already installed, or you know how you will configure it. (See the *Entuity User and System Administrator Guide*.)
- When using SSL copy the SSL files to *entuity_home*`\etc`. (See *SSL Requirements*.)

When reconfiguring Entuity always shutdown Entuity server before starting `configure`. (See *Chapter 5 - Startup, Shutdown and Process Checking*.)

The Entuity configuration process, `configure`:

- Configures the Entuity software, for example:
  - Database settings.
  - Activates and deactivates modules.
  - Sets module parameters.
  - Security settings.
  - Adds and updates available reports.
- Sets the ports that Entuity uses, e.g. for event receiving, Entuity database.
- Sets up necessary services.
- Allows you to select the license file.

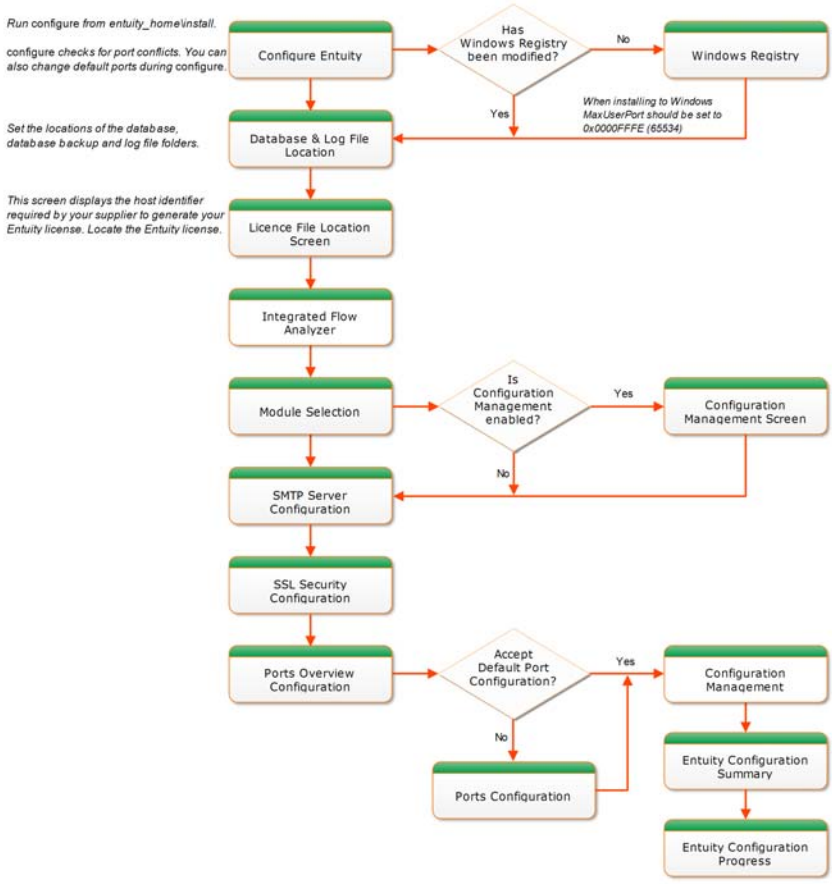

Figure 12 Entuity Configure Process

Configuring Entuity Using the Configure Wizard

The Entuity Configure wizard is actioned through a Java based installer. The Java installation is included with the software and does not overwrite any previous Java installation on your system. A series of screens guide you through the installation, online help is available by clicking on **Help**. You can also use **Back** and **Next** to move backwards and forwards through the installation process.

Button	Description
Next	Displays the next window.
Back	Displays the previous window.

Table 12 Install and Configure Wizard Buttons

Button	Description
Help	Displays context sensitive help.
Cancel	Cancels the configuration.
Browse	Opens a dialog to browse through the directory structure.
Restore	Redisplays the original default.
Help	Displays the context sensitive help.

Table 12 Install and Configure Wizard Buttons

To configure Entuity:

1) Run `install` and use the GUI install wizard. From *entuity_home*\`install`:

   - In Linux environments enter:

   `./configure gui`

   - In Windows environments enter:

   `configure`

   - In Windows environments double-click on `configure`.

   `configure` checks that Entuity is not running, and would display a warning message if it were, otherwise `configure` opens the Entuity Server Configuration wizard.

2) When the registry key value *MaxUserPort* is not set to 0x0000FFFE (65534) this risks causing problems in Entuity performance. You can manually set the key, or when you run `configure` use the Window Registry page to set this value (the default setting).

   Permit or deny `configure` to amend *MaxUserPort* and click **Next**.

Figure 13 Automatic Registry Change

3) In the Choose Configuration Folders page specify the database and log file directories. When you have specified the folders click **Next**.

Directory	Description
Database installation	The folder for the Entuity database. The default is *entuity_home*\database\data.
Database Backup	The folder for the database backup. The default is *entuity_home*\database\backup.
Log	The folder to where Entuity writes all of its associated log files. The default is *entuity_home*\log.

Table 13 Database and Log Directories

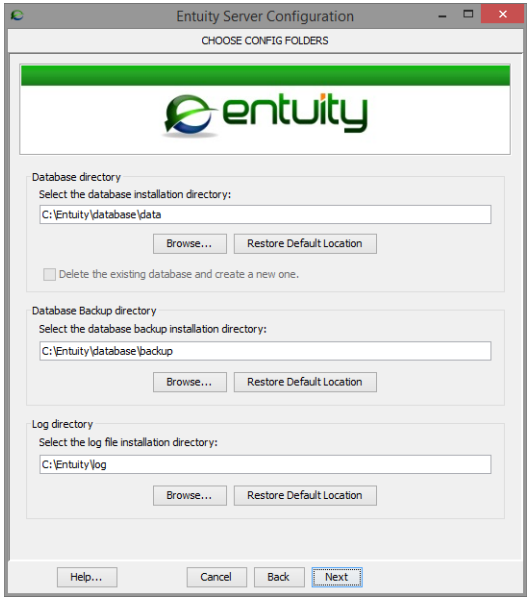

Figure 14 Specify Database and Log Directories

4) When running `configure` on an existing Entuity server `configure` prompts you to retain or delete the existing database. By default Entuity selects to retain the database.

   Choose whether you want to delete or retain the existing database and then click **Next**.

5) `configure`:

   - Displays the host identifier of the Entuity server, which your Entuity contact requires to generate a valid license.
   - Prompts you to confirm or amend the name and location of the license file. The evaluation license is valid for thirty days from installation, by default *entuity_home*`\etc\license.30day.eval.dat`.

Entuity checks the host identifier by running `hostident`. On Windows environments this requires the Windows Management Information service to be running. If the service is not running `configure` would fail to complete.

When you have specified the Entuity license file click **Next**.

`Configure` validates the license file, validation may take thirty seconds. `Configure` raises an error if the license does not exist or is invalid. You cannot complete Entuity configuration without a valid Entuity license.

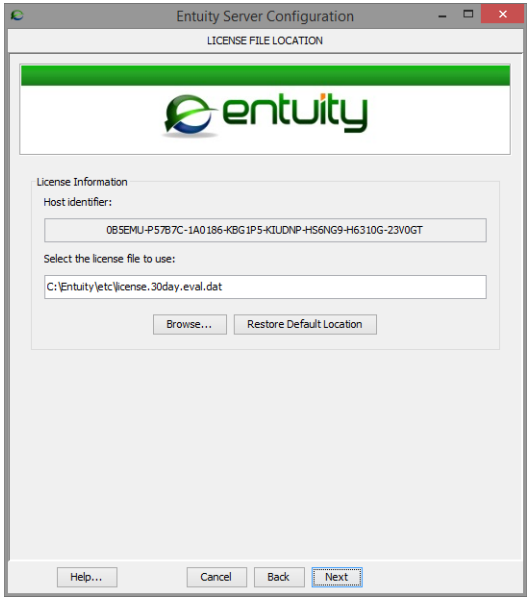

Figure 15 Entuity License File Location

6) `configure` displays the Integrated Flow Analyzer screen from which you can select:

- **Yes** to configure a server which acts as both a polling and flow collector server, also referred to as an All-in-one server.
- **No** to configure a server which acts as only a polling server. The first time you run `configure` this is the default option, also referred to as a Standard server.

Select the required capability and click **Next**.

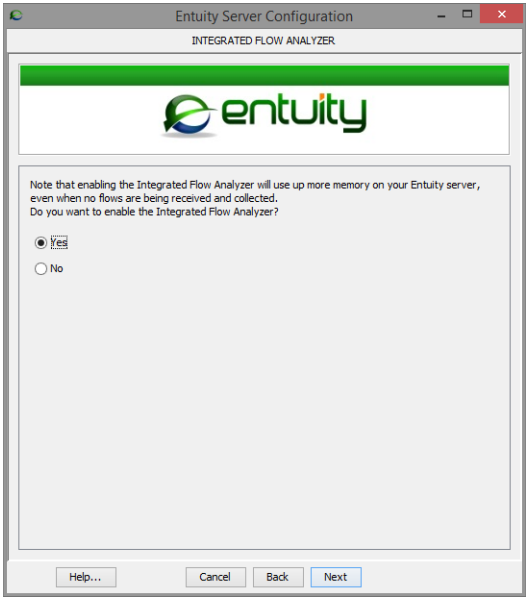

Figure 16 Entuity Integrated Flow Analyzer

7) `configure` displays a list of modules and against each is its current enabled and license status. Entuity can only run modules with a valid license. Where modules are:

   - Enabled `configure` can activate the modules.
   - Disabled they are not activated.

   Use the check box against each licensed module to select the ones you want to activate, and click **Next**.

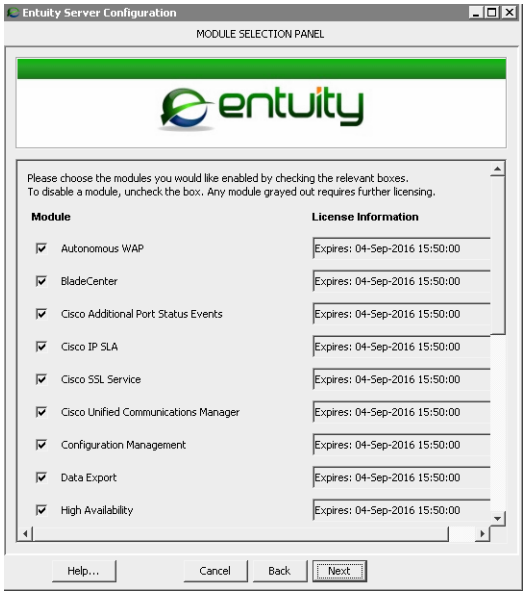

Figure 17 Select Licensed Modules

8) When you selected Entuity Configuration Management on the module page `configure` displays the Configuration Monitor page. You should have already consulted the Entuity Configuration Management documentation.

When you have specified the Entuity Configuration Management click **Next**.

Attribute	Description
Transfer Server IP Address	`configure` displays a list of the IP addresses on the Entuity server. Select the IP address you want to use with the TFTP and/or FTP servers used in retrieving device configurations.
Transfer Directory	The directory on the Entuity server to which the TFTP and/or FTP server writes retrieved device configurations, by default *entuity_home*`\cm_transfer`. You must separately configure the TFTP or FTP server to use this directory, for example through the TFTP server initialization file.
Archive Directory	Entuity moves successfully retrieved device configurations from the Transfer Directory to device specific sub-directories of the Archive directory, which is by default *entuity_home*`\cm_archive`.

Table 14 Configuration Management

You must separately configure remote shell, i.e. Telnet, SSHv1 or SSHv2, and transfer servers, i.e. TFTP and/or FTP.

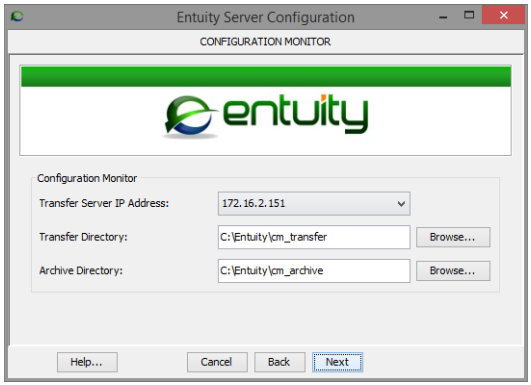

Figure 18 Specify Configuration Monitor

9) `configure` prompts for you to define a connection used for forwarding incidents and events to a cell on the BMC TrueSight Infrastructure Management Server. This connection is used with the **Send to BMC Event Manager** action which you can set up through the Event Management System. Entuity Support recommend you send either incidents or events but not both to the same receiver.

   You can define additional BMC TrueSight Infrastructure Management Server connections through *entuity_home*\etc\`bem-connections.cfg`. (See the *Entuity User and System Administrator Guide*.) You should obtain the BMC TrueSight Infrastructure Management Server connection details from its administrator.

Ensure the firewall settings in the BMC II Web Services Server allow connections from the Entuity Server.

Attribute	Description
BMC Cell Name	BMC Truesight Operations Management instance to which Entuity can forward incidents and events. A BMC TrueSight Infrastructure Management Server administrator can find the cell name by opening: *<IIWS HOME>*`\Tomcat\webapps\imws\WEB-INF\etc\mcell.dir` and locating the cell definition, for example: `cell` **`pncell_entuity`** `gateway.pn_server mc entuity:1828`
Web Server Host Name	Hostname of the server where the BMC II Web Services Server is located.
Web Server Port Number	Port number used by the BMC II Web Services Server, by default **9080**.
Web Service Name	Name of the web service, by default `ImpactManager`.

Table 15 BMC TrueSight Infrastructure Management Server Connection Details

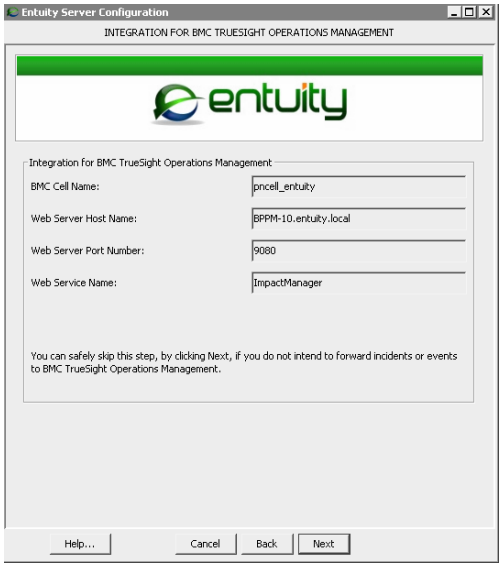

Figure 19 Configure the Integration

10) `configure` prompts for the SMTP Server details, which you only need complete when requiring the emailing of events and/or reports, and then click **Next**.

Attribute	Description
SMTP Server Hostname	Enter a semi colon separated list of SMTP servers. You can also specify the port number servers use, for example: `10.44.2.6;10.44.2.7:25`
SMTP Username	Username used with the server. When not using a username you can leave it blank, enter a username and you must also enter a password in *SMTP Password*.
SMTP Password	You are only required to enter a value when you have also entered an *SMTP Username.*
Show password in plain text	Select when you want the SMTP password displayed. By default it is represented by asterisks.
Sender	Enter the default sender email address. You can configure spam filter programs to permit through emails from this account. The default email account name is Entuity@EntuityServer, where Entuity identifies the product and EntuityServer is the hostname of the Entuity server.
Subject	Provides the default subject line included with any email. When an email is sent **${eventDescr}** is replaced with the event description and **${eventStr}** is replaced with the object name for which the event was raised.

Table 16 SMTP Server Details

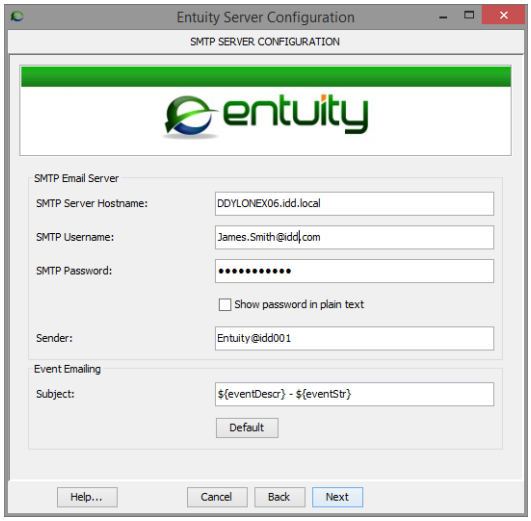

Figure 20 Entuity SMTP Server Configuration

11) `configure` displays the Server configuration page.

Click **Next**.

Attribute	Description
Hostname	Entuity by default includes the hostname of the Entuity server. This is a mandatory field.
Use SSL Communication	Select to activate SSL for sessions between your Entuity server and browsers. This is not mandatory and is only normally required in environments requiring a highly secure environment. Specify your SSL certificate and key files: ■ SSL Certificate File ■ SSL Private Key ■ SSL CA Certificate (optional). Entuity recommend these files are installed to *entuity_home*/`etc`.
Redirect HTTP to HTTPS	Select for the Entuity web server to automatically redirect wrongly entered HTTP URLs to HTTPS.
Change Database Root Password	Select to enter a new root password. You would normally only change the database root password when mandated by a security team/department. It is important to record the setting as it might be needed by the Entuity Support team.

Table 17 Server Configuration

Attribute	Description
Check and Repair Database	Database Validation is not run when you first install Entuity (there is no database that requires validation). However when `configure` is re-run you may want to initiate a database check. Select this option and then: ■ **Quick Check**, which is the default when there is an existing database but no `mysql.error.log` (which is usually the case when running an Entuity upgrade). `configure` runs `dbcheck -F` to run a fast check for tables that were not properly closed. ■ **Full Check Private Key**. `configure` runs `dbcheck -E`, `dbcheck` runs a full key lookup for all keys for each row which ensures that the table is 100% consistent. This is an extended database check and, depending on the size of the database, may take a significant length of time to complete. If the Entuity database fails the validation check `configure` stops.

Table 17 Server Configuration

You must source your own SSL certificate and decide who will authorize it. There are specialist companies you can use, alternatively there are utilities, not supplied with Entuity, that allow you to generate your own SSL files.
However you create the SSL files you first generate a Certificate Signing Request (CSR) using `Apache Mod_SSL/OpenSSL` (consult the Apache documentation for details). This process creates the SSL Private Key that you must keep safe and CSR that must be authorized. Authorization is through an outside, recognized authority or there are utilities that allow you to become your own certification authority. The authority generates from the CSR the SSL certificate.

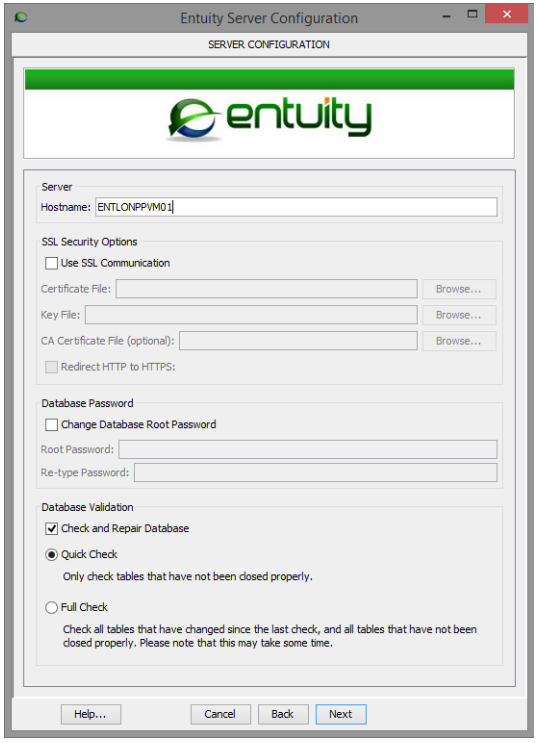

Figure 21 Configure Entuity Server

12) `configure` displays the Ports Configuration page through which you can select:

- Use preselected port numbers, that is the default setting which assigns to Entuity and its processes the default ports.
- Modify port numbers. `configure` subsequently displays additional pages through which you can amend the default TCP port numbers of Entuity processes. You should only amend the default TCP port settings with good reason.

When you have specified the ports configuration settings click **Next**.

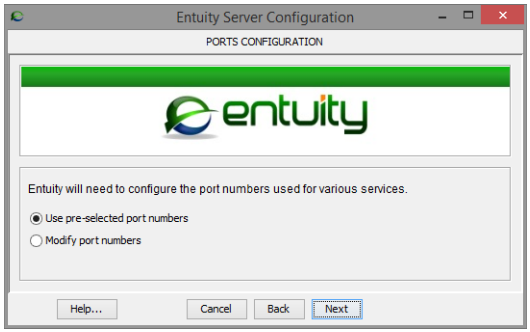

Figure 22 Specify Port Numbers

13) Only when you have selected to modify the default port settings, or Entuity has identified a port conflict, does `configure` display the current list of ports. Port numbers that have a green background are valid, ports with a red background indicate a port conflict that requires attention.

You can enter new port numbers directly into the text field, and use **Test** to verify the port is available. Alternatively use **Suggest** and `configure` identifies the next available port number.

Excluding *Web Port,* port numbers must be in the range 1025 to 65535. The defaults are reasonable choices. You have another chance to change your selections when the summary is displayed at the end of the wizard.

When you have specified the port settings click **Next**.

Attribute	Description
Database Port	The IP port on which you want the database server `mysqld` to listen. The default is port 3306.
Web Port	The IP port on which you want the web server `httpd` to listen. The defaults are port 80 for non-secure access and port 443 for SSL.
Event Request Listener Port	IP port on which you want the event management process to listen for incoming requests for events, for example from the event viewer, from subscribed third party integrations. The default is port 19193.
Event Receiver Port	Event Receiver IP port on which you want the event management process to listen for incoming requests for events, for example system events, trap-based events, syslog events. The default is port 19194.
Ticker Port	The IP port on which you want the ticker process to monitor its client ports' activity. The default is port 20202.
Tomcat Port	The port used by the application server Tomcat. The default is port 8080.
Tomcat Admin Port	The port used to access and managed the application server Tomcat. The default is port 8005.

Table 18 Entuity Ports

Attribute	Description
Flow Port	The port on which Entuity IFA receives flow information from devices sending NetFlow, Netstream or JFlow packets. This flow collector port is configurable through `configure` and `flowcfg.properties`. Entuity IFA collects IPFIX flow data on port 2055 and sFlow data on port 6343. These collector ports are not configurable, you must therefore ensure routers using those flow technologies are configured to send data to the appropriate ports otherwise Entuity IFA will not recognize and collect the data.
Flow Management Port	The port used to manage, e.g. stop, the Flow Collector process. The default is port 12121.

Table 18 Entuity Ports

14) When installing to Linux `configure` prompts for the user account which is to have the privileges required to start, stop and reconfigure Entuity, by default **root**.

When required enter a new username, alternatively accept the currently set username.

Click **Next**.

15) `configure` displays a summary of your configuration settings. This is the final opportunity to amend, or cancel, your Entuity configuration selections.

Click:

- **Cancel** to abandon the configuration.
- **Back** to move back through the configuration wizard pages and adjust your settings.
- **Configure** to start Entuity configuration.

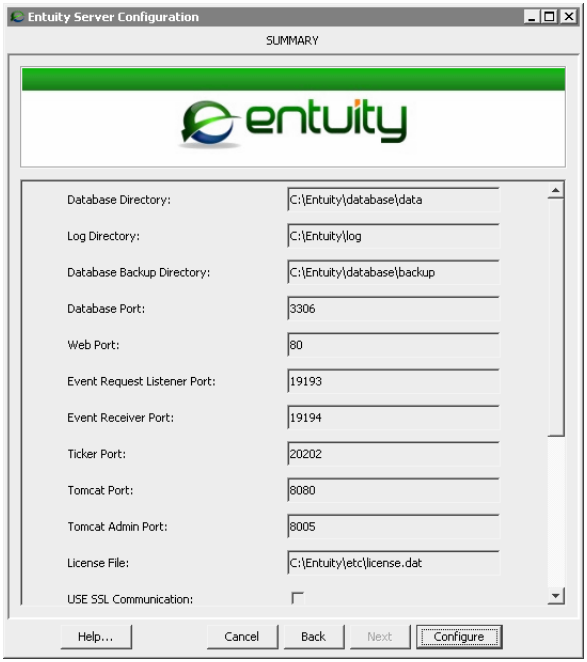

Figure 23 Final Configuration Check

16) `configure` displays a configuration progress page. This may take some time, with the running of the StormWorks configuration on its own taking a couple of minutes.

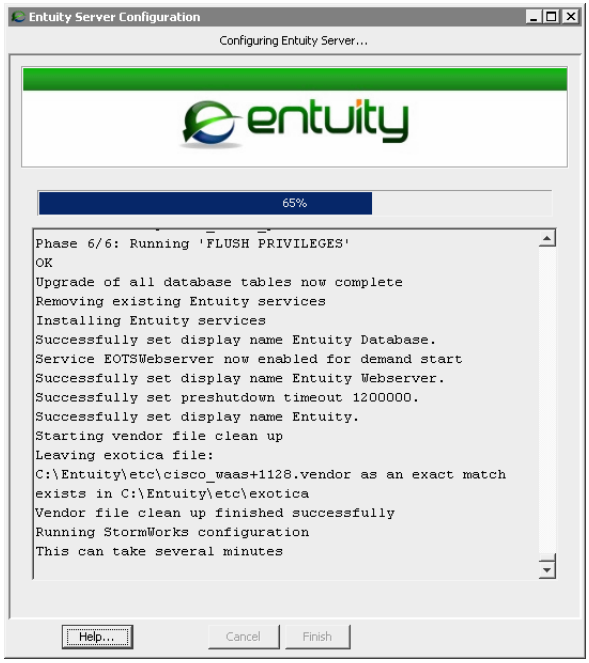

Figure 24 Configuring Entuity

17) `configure` displays whether the configuration has successfully completed. If configuration:

- Failed check the Java command window to see at which stage it halted. You may need to provide your Support contact with these log files, `EYEConfigure.log` and `dsKernelStatic.log`, from your Entuity log file folder.
- Succeeded take an initial backup of the system. (See *Chapter 7 - Back Up the Entuity Data*.)

18) Start Entuity. (See *Chapter 5 - Startup, Shutdown and Process Checking*.)

Configuring Entuity from the Command Line

By default Entuity is configured on Linux systems from the command line. In Windows environments by default `configure` runs through a wizard, however you can also run `configure` from the command line. `configure` is installed to *entuity_home*`\install`.

`configure` only displays modules that you have activated and for which you have a license. You should refer to the particular module guide before installing the module.

To configure Entuity:

1) From *entuity_home*`\install` run `configure`:

- In Linux environments enter:

```
./configure
```

- In Windows environments enter:

```
configure text
```

`configure` starts and displays the operating system and the host identifier.

Entuity checks the host identifier by running `hostident`. On Windows environments this requires the Windows Management Information service to be running. If the service is not running `configure` would fail to complete.

2) `configure` prompts for the location of the Entuity database:

```
Database Directory [/Entuity/database/data]>
```

Either press **<Return>** to accept the default, or enter an alternative destination, without spaces, and press **<Return>**. If the path does not exist, then you are prompted to confirm that you want to create a new directory.

3) When performing a reconfiguration `configure` prompts you to delete the existing database or create a new one:

```
Would you like to delete the existing database and create a new one?
[no]>
```

Either press **<Return>** to accept the existing database, or to create a new database enter Yes, and press **<Return>**.

4) `configure` prompts for the location of the backup folder of the Entuity database:

```
Database Backup Directory [/Entuity/database/backup]>
```

Either press **<Return>** to accept the default, or enter an alternative destination, without spaces, and press **<Return>**. If the path does not exist, then you are prompted to confirm that you want to create a new directory.

5) `configure` prompts for the location of the log directory:

```
Log Directory [/Entuity/log]>
```

Either press **<Return>** to accept the default, or enter an alternative destination, without spaces, and press **<Return>**. If the path does not exist, then you are prompted to confirm that you want to create a new directory.

6) `configure` prompts you to create the log directory:

```
Do you want to create the log Directory [no]>
```

Enter **y** to create the directory.

7) `configure` prompts for the location of the license file:

```
License File [/Entuity/etc/license.dat]>
```

Either press **<Return>** to accept the default, or enter an alternative destination, without spaces, and press **<Return>**. If the path does not exist, then you are prompted to confirm that you want to create a new directory.

If the license file is empty configure prompts you to create it. If you answer **n** followed by **<Return>**, you are returned to step 7). If you answer **y** followed by **<Return>**, then a text editor is opened to allow you to save text into it.

`configure` validates the license file, raising an error if the file does not exist or is invalid. You cannot complete Entuity configuration without a valid Entuity license.

8) `configure` prompts you to activate the Integrated Flow Analyzer capability. Enter:

- **Yes** to configure a server which acts as both a polling and flow collector server, also referred to as an All-in-one server.
- **No** to configure a server which acts as only a polling server. The first time you run `configure` this is the default option, also referred to as a Standard server.

9) `configure` prompts you to accept or modify the current module activation settings:

```
Would you like to modify the Module Selection [no]>
```

When you enter:

- **no** during a new installation `configure` activates those modules enabled through *entuity_home*`/etc/modules_definition.cfg`, during upgrades `configure` checks, and gives precedence to, module enabled settings in *entuity_home*`/etc/installed_modules.cfg`.
- **y** `configure` displays in turn each module. For those identified as licensed you have the option of installing, **y**, or not installing, **n**.

10) Only when you have activated the Configuration Monitor module does `configure` display a series of Configuration Monitor prompts.

You must separately configure remote shell, i.e. Telnet, SSHv1 or SSHv2, and transfer servers, i.e. TFTP and/or FTP.

When you have specified the Entuity Configuration Monitor click **Next**.

Attribute	Description
Transfer Server IP Address.	`configure` displays a list of the IP addresses on the Entuity server. Select the IP address you want to use with the TFTP and/or FTP servers used in retrieving device configurations.

Table 19 Configuration Monitor

Attribute	Description
Transfer Directory	The directory on the Entuity server to which the TFTP and/or FTP server writes retrieved device configurations, by default *entuity_home*\cm_transfer. You must separately configure the TFTP or FTP server to use this directory, for example through the TFTP server initialization file.
Archive Directory	Entuity moves successfully retrieved device configurations from the Transfer Directory to device specific sub-directories of the Archive directory, which is by default *entuity_home*\cm_archive.

Table 19 Configuration Monitor

11) Enter the server and user profile details Entuity uses when generating emails:

```
SMTP Server Hostname []> DDYLONEX06.ddy.local
SMTP Username []> james.smithg@ddy.com
SMTP Password []> password
Sender []> ddy@century.ddy.local
Subject [${eventDescr} - ${eventStr}]>
```

12) In *Hostname* Entuity by default includes the hostname of the Entuity server. This is a mandatory field.

13) By default SSL is not activated. Enter **Y** to the **Use SSL Communication** prompt, and enter the full name and path details of your SSL key and certificate files:

```
Use SSL Communication? [no]> y
SSL Certificate File []> C:\Entuity\etc\ssl-server.cer
SSL Private Key File []> C:\Entuity\etc\ssl-server.key
SSL CA Certificate File (optional) []> C:\Entuity\etc\root-cacert.cer
```

14) `configure` prompts for a change to the default database password:

```
Change Database Root Password?
```

15) `configure` prompts you to run a database validation and possible repair.

Database Validation is not run when you first install Entuity (there is no database that requires validation). However when `configure` is re-run you may want to initiate a database check. Select this option and then:

- **Quick Check**, which is the default when there is an existing database but no `mysql.error.log` (which is usually the case when running an Entuity upgrade). `configure` runs `dbcheck -F` to run a fast check for tables that were not properly closed.
- **Full Check**. `configure` runs `dbcheck -E`, `dbcheck` runs a full key lookup for all keys for each row which ensures that the table is 100% consistent. This is an extended database check and, depending on the size of the database, may take a significant length of time to complete.

If the Entuity database fails the validation check configure stops.

16) `configure` prompts for the user account name of the user who is to have the privileges required to start, stop and reconfigure Entuity:

```
User [root]>
```

Either press **<Return>** to accept the default **root**, or enter a valid user ID and press **<Return>**.

17) `configure` prompts you to accept or modify the default ports used by Entuity:

```
Use pre-selected port numbers [Yes]>
```

When you enter **n**, configure prompts you for each port number. Ports should be in the range 1025 to 65535 (except for the web port, which can be 80):

```
Database Port [3306]>
Web Port [80]>
Event Request Listener Port [19193]>
Event Receiver Port [19194]>
Ticker Port [20202]>
Tomcat Port [8080]
Tomcat Admin Port [8005]
Flow Collector Port [9996]
Flow Management Port [12121]
```

Attribute	Description
Database Port	The IP port on which you want the database server `mysqld` to listen. The default is port 3306.
Web Port	The IP port on which you want the web server `httpd` to listen. The defaults are port 80 for non-secure access and port 443 for SSL.
Event Request Listener Port	IP port on which you want the event management process to listen for incoming requests for events, for example from the event viewer, from subscribed third party integrations. The default is port 19193.
Event Receiver Port	Event Receiver IP port on which you want the event management process to listen for incoming requests for events, for example system events, trap-based events, syslog events. The default is port 19194
Ticker Port	The IP port on which you want the ticker process to monitor its client ports' activity. The default is port 20202.
Tomcat Port	The port used by the application server Tomcat. The default is port 8080.
Tomcat Admin Port	The port used to access and managed the application server Tomcat. The default is port 8005.

Table 20 Entuity Ports

Attribute	Description
Flow Port	The port on which Entuity IFA receives flow information from devices sending NetFlow, Netstream or JFlow packets. This flow collector port is configurable through `configure` and `flowcfg.properties`. Entuity IFA collects IPFIX flow data on port 2055 and sFlow data on port 6343. These collector ports are not configurable, you must therefore ensure routers using those flow technologies are configured to send data to the appropriate ports otherwise Entuity IFA will not recognize and collect the data.
Flow Management Port	The port used to manage, e.g. stop, the Flow Collector process. The default is port 12121.

Table 20 Entuity Ports

18) `configure` displays the parameter settings and prompts you to continue the configuration:

```
Do you want to continue? [no]>
```

Either press **<Return>** to halt the configuration, or enter **y** and press **<Return>** to implement it.

19) When configuration is complete `configure` displays:

```
Configure completed successfully
```

Press **<Return>** to return to the *entuity_home* directory.

20) The first time you complete Entuity configuration you should take an initial backup of the system. (See *Chapter 7 - Back Up the Entuity Data*.)

21) Start Entuity. (See *Chapter 5 - Startup, Shutdown and Process Checking*.)

5 Startup, Shutdown and Process Checking

This chapter details the procedures for starting and shutting down Entuity, and for checking the statuses of system processes.

Start Entuity

To start Entuity when you are running it under:

- Windows, the installation default is for Entuity to automatically start when Windows starts. It does this through the services:
  - **Entuity** which is the main Entuity service. It starts and stops the other Entuity services and controls all Entuity functions, apart from the web server and the database processes.
  - **Entuity Webserver** which controls the Entuity web service.
  - **Entuity Database** which controls the database processes.

Entuity Support recommend configuring Entuity to also automatically start under Linux environments.

- Windows and Linux from the command line run *entuity_home*`\bin\starteye`. For example, in Linux enter:
  `./starteye`

As Entuity starts, it starts the processes in this order:

1) `dbcheck`
2) `mysqld` (MariaDB Database Server)
3) `httpd` (Web Server)
4) `licenseSrvr` (License Server)
5) licenseServerCheck
6) `viewserver`
7) eventEngine
8) `DsKernelStatic`
9) `provost` (Scheduler)
10) `ticker`
11) `prologV2`
12) proliferate
13) `applicationMonitor`
14) `eyepoller`
15) `sysLogger`
16) `diskMonitor`
17) `macScheduler`
18) flowcollector
19) `tomcat`
20) `eosserver`
21) `search`.

Each time Entuity starts it runs `dbcheck` which checks that the database was previously correctly closed down, for example a power failure may leave some tables open. `dbcheck` runs before the database starts and if it identifies problems that require repairing calls myisamchk.

The time taken to run a full check and repair of the database varies according to the size of the managed network. A slow Entuity startup may indicate an automatic repair of the database has taken place.

Starting the Server for the First time

An Entuity server's license specifies the modules and integrations permitted on that server. This local license can also set the object and device credits available to the server. As soon as you start Entuity it is ready to manage your network.

Alternatively, you can use a central Entuity licensing server to manage object and device credit allocation. Under this model when you first start the server license credits must be explicitly assigned to it before the server can manage network objects; the server starts in unlicensed mode without any assigned license credits.

Shutdown Entuity

The Entuity system processes should only be stopped when you want to:

- Perform a server reboot.
- Upgrade, or during the current session have already upgraded, the Entuity software, database, or license. (See *Upgrade the Entuity License*.)

There are a number of ways to stop Entuity. When you are running Entuity under:

- Windows, the installation default is for Entuity to automatically stop when Windows stops. Entuity recommend you explicitly stop Entuity and do not rely on Windows to close Entuity down.
- Windows, use the Service function, available from the Control Panel, to start and stop Entuity while Windows is running.
- all operating systems, from the command line run *entuity_home*`\bin\stopeye`. For example, in Linux enter:

  ```
  ./stopeye
  ```

Only kill processes as a last resort and only use the TERM signal, if processes are taking a long time to stop do not use any other command. On systems with large databases or slow disks the data server processes can take a few minutes to terminate.

Entuity stops the processes in this order:

1) `search`
2) `eosserver`
3) `sysLogger`
4) `tomcat`
5) `macScheduler`
6) `diskMonitor`
7) `applicationMonitor`
8) `prologV2`
9) `ticker`
10) `provost` (Scheduler)
11) `DsKernelStatic`
12) `viewserver`

13) `licenseSrvr` (License Server)
14) `httpd` (Web Server)
15) `mysqld` (MariaDB Database Server).

You can examine the status of the Entuity central processes through the Process Health page, available by clicking **Administration > Entuity Health > Process Health**. (See the *Entuity User and System Administrator Guide*.)

6 Entuity Licensing

Entuity supports standalone and distributed (Central License Server) licensing architectures. With Standalone licensing each Entuity server has its own license file. With Central License Server licensing the central server license file contains all of the licensing information, the remote servers have a license that identifies their central server.

Entuity licensing server compares the Entuity license file with the configured Entuity server. It checks:

- The version of Entuity.

  If you install a major new release of Entuity you will require a new license.

- The license expiry date.

  Entuity raises license expiry events when the license, or modules within it, are close to expiry which is by default from 30 days before license expiry.

- The available modules and integrations.

  Only licensable modules and integrations with a valid entry in the license file can be activated.

- The number of object and/or device credits available. (See *Entuity Device and Object Licensing Models*.)
- Whether the Entuity server machine is the expected machine. For standalone and Central License Server licenses Entuity checks the license is:
  - Generated using the machine's host identifier.
  - For a physical machine or a virtual machine. Entuity licenses are generated for either virtual or physical machines, a license generated for one type of machine will not work on the other.

  Remote servers only require a license that is associated with their Central License Server, its host identifier and whether it is a virtual or physical machine is not considered.

Entuity licensing relies on the server machine having the same host identifier as its Entuity license (with central server licensing this is true of the central server only). When you install Entuity it checks the host identifier by running `hostident`. On Windows environments this requires the Windows Management Information service to be running. If the service is not running `install` and `configure` would fail to complete.

- For Central License Servers how many remote servers it can support.

Typically, this license information remains unchanged, although you may need to increase the number of object credits if your network expands or to install new Entuity modules.

Entuity License Files

Entuity includes an evaluation license, *entuity_home*\etc\license.30day.eval.dat, which is valid for 30 days from the date of its installation. When using an evaluation license Entuity displays in its web UI banner the days and hours remaining until the license expires.

When you run `configure` the default name and install location of a full license is *entuity_home*\etc\license.dat. However the license files you receive from your Entuity representative have a unique name, for example a:

- Standalone server license would have the format:
  License.Entuity.*CustomerName*.*hostname*.*UniqueID*.dat
- Central Licenser Server license would have the format:
  License.Entuity.*CustomerName*.*hostname*.*UniqueID*_central_server.dat
- Remote Server license would have the format:
  License.Entuity.*CustomerName*.*hostname*.*UniqueID*_remote_server.dat

Entuity Support recommend you do not rename the supplied licenses. If you retain the supplied license name it will assist Entuity Support if they ever have to troubleshoot licensing issues.

Standalone and Central License Server Licensing

When you have more than one Entuity server you have a decision on how to manage your licenses. You can request a standalone license for each Entuity server, or use Central License Server licensing. With a:

- Standalone license what an Entuity server can manage is determined by the characteristics of its installed license, for example how many network objects it can manage. Those characteristics are set when the license is created.
- Central License Server model the license installed to the central server determines the potential capability of its remote servers. However administrators then have the flexibility as to how they set up the remote severs, for example how many network objects they can manage.

  The license installed to remote servers is only used to identify their Central License Server.

Standalone Entuity Server Licensing

When a site's servers use standalone licenses each Entuity server's license:

- Is associated to that particular machine through its host identifier.
- Includes the number of license credits available to that server.
- Determines what modules and integrations you can enable on the server.

For example, if you have ten servers you require ten licenses each generated with the specific server's host identifier and each with a license credit allocation.

Figure 25 Standalone Licensing

Standalone licensing is therefore usually most suitable:

- For relatively small sites.
- Where the number of network objects managed by each of the Entuity servers is known and stable.
- When the Entuity servers are not moved between machines; a VMware VMotion environment would not be suitable.
- When communication between Entuity servers is not guaranteed, for example they are in different subnets, and therefore the Entuity Central License Server model is not appropriate.

Entuity Central License Server

The Entuity Central License Server licensing model is suitable where you have multiple Entuity servers:

- When requesting a license from your Entuity representative it only requires you to know the total number of network objects (or devices and network objects if using that licensing model) that you might want to manage and how many remote servers are required.

  From the Central License Server you must actively assign license credits to a remote server for it to manage network objects (if you want the Central License Server to manage objects you must also assign it license credits). and deassign license credits to its remote servers.

- You only have to provide the host identifier of one machine, the machine hosting the Central License Server.

  Only the Central License Server is fixed to a particular machine, remote servers are only tied to the Central License Server and not to the machine hosting them. Remote servers are therefore fully compatible with VMware VMotion technology.

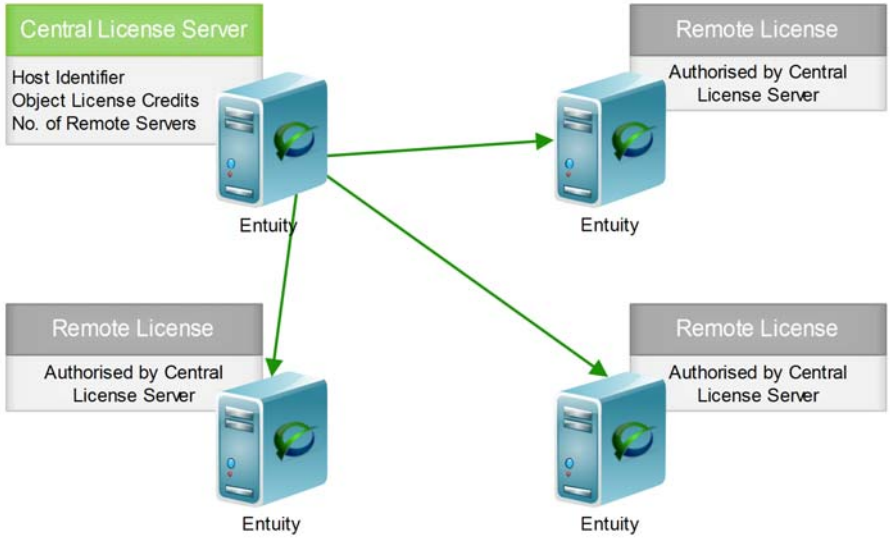

Figure 26 Central License Server Licensing

For example, if you have ten servers you are supplied with two licenses:

- One central server license installed to the central server which defines the available modules, and the pool of device and object credits from which you assign credits to remote servers.

  When you want the central server to also manage devices, you must also assign credits to it in the same way as a remote server.

- One remote license which you install to the nine remote servers. From the central license server you assign to the remote server license credits.

Hosting the Central License Server

A Central License Server architecture is appropriate when implementing Entuity in a VMware VMotion environment as it can handle the remote Entuity servers moving to different virtual machines. However the Central License Server is tied to a specific machine, you therefore should not install it to a virtual machine that is part of a VMware VMotion setup.

If the machine (virtual or physical) on which the Entuity Central License Server is hosted changes then the host identifier changes and the license becomes invalid. Within 24 hours

the server stops. You then have seven days to install a new valid license otherwise its remote servers will also stop managing your network.

Entuity Support recommend you do not use a Central License Server to manage network objects or as a consolidation server.

Assigning License Credits to Entuity Servers

Entuity Device and Object Licensing Models

Licensing can be device or object based, a decision made when you purchased Entuity:

- Device licensing allows you to manage up to a fixed number of devices and an associated number of objects, e.g. ports. This has a number of implications for how Entuity behaves when reaching license credit limits, for example:
  - License credits are not transferable between the devices and objects. If you have used all of your device credits you cannot use an object credit to manage a new device. You would have to first free a device credit by unmanaging a currently managed device.
  - Entuity would prevent you managing a device with ports if there are no free object credits. Similarly it would not discover new ports on a device if there are no free object license credits.
- Object based licensing allows you to manage a fixed number of objects, it does not distinguish, for example between devices and ports.

Entuity also licenses individual modules, e.g. IFA Premium, Cisco IOS IP SLA, and integrations, e.g. Entuity Integration Module for BMC Atrium CMDB.

Assigning License Credits

When you install a server with a standalone license the license credits are already assigned to the server and cannot be amended. With a Central License Server when you first start the license server itself or a remote server, they do not have license credits assigned. For a:

- Central License Server you can login to the server and allocate license credits.
- Remote server you can login but Entuity displays an information message informing you that it requires license allocation from the Central License Server.

Using a central licensing server allows you to allocate and re-allocate licensing credits to remote servers as their requirements change. For example, you may have three servers each with local licenses that support the same number of objects. These licenses may not reflect the current loading on those servers. With a Central License Server you can assign fewer license credits to the lighter loaded server, and more credits to the more heavily loaded server.

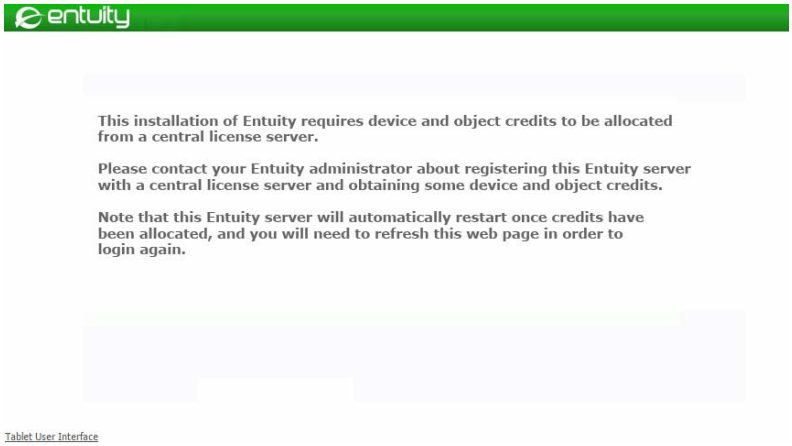

Figure 27 Remote Server No License Credits Allocated

To associate remote servers and assign license credits:

1) From the Central License Server click **Administration > Multi-Server Administration**.

   Entuity displays the Remote Servers page. The Central License Server is already displayed in the Remote Entuity Server section, to assign it credits go to Step 3).

   From the Remote Entuity Server section click **Add**.

2) Complete the Add Remote Entuity Server details and click **Submit**.

3) From the Remote Entuity Server highlight the remote server and then click **Licenses**.

   Entuity displays the Change license allocation dialog.

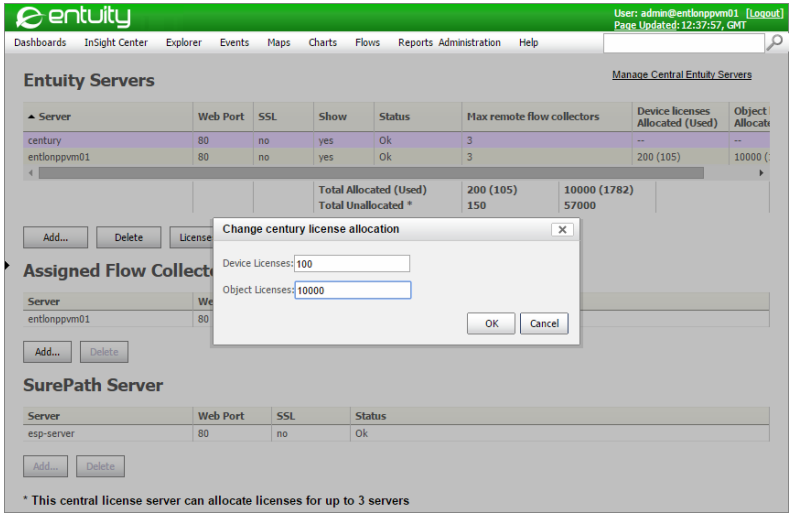

Figure 28 Allocating Remote Server License Credits

4) Depending upon the license credit model you can enter the number of device and object license credits to assign to the server.
5) Click **OK**.

   Entuity assigns licenses to the selected server. When you have assigned credits to:

   - The central server or amended the number of credits assigned to a remote server, that server continues running with the new credit allocation.
   - A remote server that previously did not have a credit allocation, that triggers it to restart in a licensed mode. The Central License Server may temporarily report the remote server state as Down.

Deallocating License Credits to Entuity Servers

From a Central License Server can manage the license credits of its remote servers.

When a remote server is unavailable you cannot deallocate its license credits, you must wait for it to be available. When a server is permanently unavailable, for example the remote server is restored from a backup to a new install, then you must wait for one week until the license credit allocation stales. After one week Entuity frees up the license credits and they are ready for reallocation. When possible you should therefore deallocate license credits before moving a server.

When you want to remove all license credits from a remote server you can set its allocation to zero through the Remote Entuity Server page. This stops polling on the server and triggers a restart of the remote server so it runs in a non-licensed mode. To remove all allocated license credits from a Central License Server you would first have to remove all managed objects.

Entuity prevents you from amending a credit allocation to fewer than the number the Entuity server requires to continue managing its currently assigned network objects. This is true for both Central License Servers and remote servers.

To deallocate license credits to a remote server:

1) Click **Administration** > **Multi-Server Administration**.
2) Highlight the remote server and then click **Edit**.
3) Set the number of device and object license credits to assign to the server to zero.
4) Click **OK**.

Check the Entuity License

You can check the status of your license:

- Through the Health Summary page, an icon indicates its overall health.
- Through the License Health page which provides a breakdown of the license components.
- By running `checkLicense` from the command line. It provides a detailed breakdown of your license components.

Running a High Level Check on the Entuity License

Through the Health Summary page you can view the current status of the Entuity license. The license status icon shows the overall health of the license.

To check the status of the current Entuity license:

1) Click **Administration > Entuity Health > Health Summary**.

   Entuity displays the Health Summary page. You can click on the license status icon to view a breakdown of the license components in the License Health page.

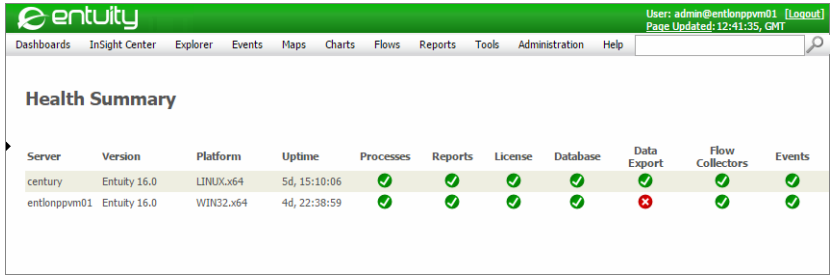

Figure 29 Checking the Health of Entuity

Viewing the Current State of the Entuity License

From the License Health page you can view the license expiry date, current license usage and licensed state of modules and integrations.

To view a breakdown of the current Entuity license status:

1) Click **Administration > Entuity Health > License Health**.

   Entuity displays the License Health page. Entuity displays a breakdown of implemented objects, the number of object licenses available and used.

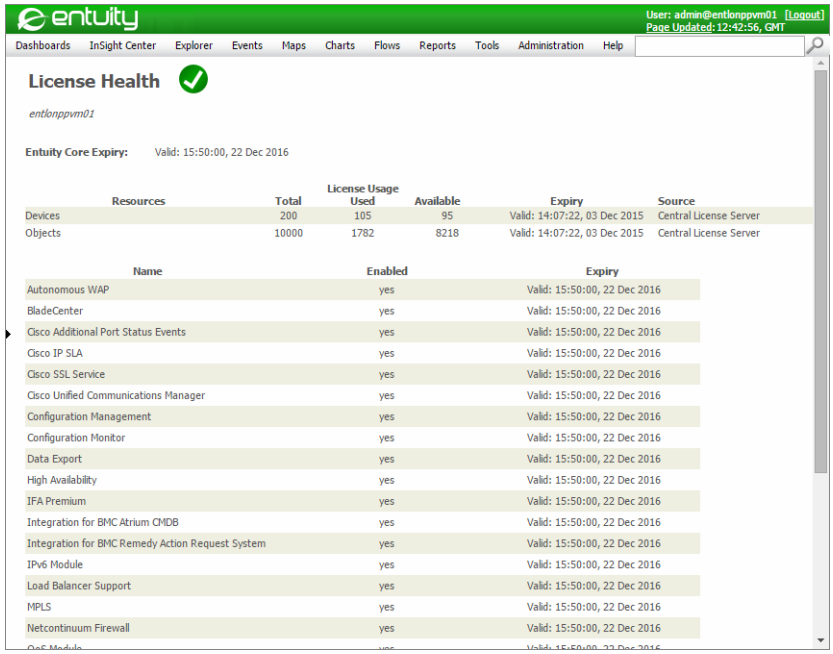

Figure 30 Checking the Health of the Entuity License

Attribute	Description
License Status Icon	When the license state is: ■ **Ok**, there are no immediate issues with the license ■ **Warning**, a running subsystem has a license that expires in 30 days or the license usage has reached 90.0% ■ **Severe**, a running subsystem has no license, the license has expired or the license usage reaches 100.0%. This icon is available through the Health Summary and License Health pages.
Server Name	Name of the current Entuity.
Entuity Core Expiry	Expiry date of the core Entuity product. For most installs this would coincide with individual module and integration expiry dates.
License Usage	
Resources	Depending on license model your license could include device and object credits.
Total	Total number of license credits available for the resource.
Used	Number of credits currently used.
Available	Number of credits currently available for allocation.

Table 21 License Health Details

Attribute	Description
Expiry	Expiry date of the resource credits.
Source	Indicates whether license credits are allocated from a local license, or a Central License Server.
Module / Integrations	
Name	Name of the module or integration.
Enabled	Set to **Yes** when enabled through `configure`, **No** when not enabled.
Expiry	Expiry date of the module or integration. For most installs this would coincide with the core Entuity product expiry dates.

Table 21 License Health Details

A Central License Server Reports Does Not Have License Credits

A central license server has a license with a pool of license credits. These credits are only available to the central license server when they have been assigned to it. You can assign licenses by considering the central license server as also being it own remote server.

Running a Detailed Check on the Entuity License

You can run `checkLicense` from the command line to check the contents of the license file (by default `license.dat`) and view a breakdown of the licensable objects and their weighting.

To run `checkLicense`:

1) Log into the command line on the Entuity server.

2) From the Entuity server bin directory run `checkLicense` against license.dat:

   `checkLicense -f pathname_of_license.dat`

   For each policy group `checkLicense` displays the objects and their license credit weighting. When an object has a license credit weight of:

   - 0, it is licensed but not charged, i.e. a free object.
   - 1 (or more), then for each managed object one (or more) credits are subtracted from the license credits available to the associated policy group.

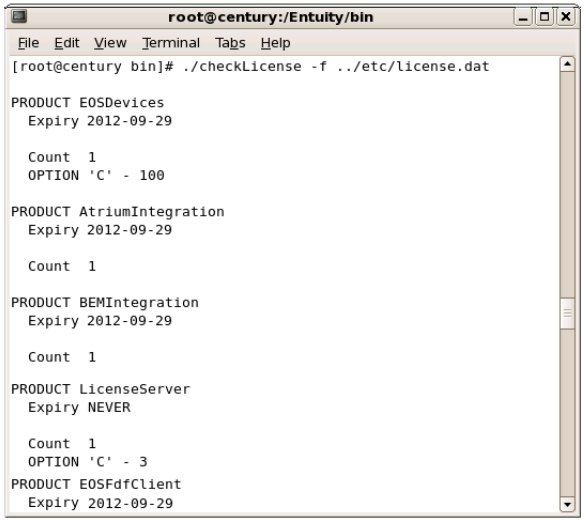

Figure 31 Running checkLicense in Linux

Identifying when a License Expires

Entuity monitors the state of the current license, checking for license expiry on its licensable components or shortage of available license credits. By default, for the thirty days before a license expires:

- Entuity displays a countdown to that expiry in its web UI banner. If this is an evaluation license that is also clearly identified, e.g.:

  `Evaluation: 4 days remaining`

- Entuity raises Entuity Server License Alert events when one or more of its licensable components is approaching an expiry date. Entuity also raises this event when one of more of its licensable components has reached its limit of managed objects.

  The event description details the licensable component(s) and the number of free credits. This is a system wide event, appearing in all views.

The License Health Summary page displays the state of the current license health. This information is also available as part of the Entuity Server Health Summary report.

Upgrade the Entuity License

The Entuity license requires updating when:

- Installing a new release of Entuity.
- Moving Entuity to a new management server.
- Changing the license credit allocation.
- Adding additional functionality through an upgrade or new modules.
- The current license is about to expire.

You can obtain from your Entuity representative a full license. You must provide the host identifier of that machine as the license file restricts installation of Entuity to the server for which you provided a host identifier. The host identifier associates the Entuity license with the physical footprint of the machine.

You can discover the host identifier by running `hostIdent`:

- Before installation, by obtaining a copy of `hostIdent` from your Entuity contact.
- As part of `install`, `install` displays the host identifier.
- As part of `configure`, `configure` displays the host identifier.

The full license, by default `license.dat`, should be copied to *entuity_home*`\etc` directory. You must then run `configure` and select this new license.

Updating the Entuity License

To update the license file:

1) Contact your Entuity representative to provide a new license.

   Ensure you know the server's host identifier. You can find the host identifier by running `hostIdent`. (See the *Entuity System Administrator Reference Manual.)*

2) Make a backup of your current license.dat file in *entuity_home*/etc/, giving the copy a different name (e.g. `license.dat.orig`).

3) Overwrite *entuity_home*`/etc/license.dat` with the new license file.

4) Shut down and restart Entuity. (See *Chapter 5 - Startup, Shutdown and Process Checking*.)

5) Check the new license is active through the Entuity web interface or run `checkLicense`.

7 Back Up the Entuity Data

Before running Entuity for the first time, re-installing Entuity or re-configuring Entuity you are strongly advised to make a system backup of the installed software and data. This will ensure that you are up and running more quickly in the event of a file system corruption, or when upgrading Entuity and inadvertently deleting data.

Back up everything included within *entuity_home*. If during configuration you installed the `database` directory somewhere other than *entuity_home*, then ensure that you back it up.

Back Up Data

When re-installing or re-configuring Entuity you should backup your data.

Entuity `backup` backs up the database, generating zipped backup files in directories under the database backup directory. If during `install` or `configure` you decide to rebuild the database then all files under *entuity_home*`\database\data` are deleted.

When backing-up the Entuity database files but not using the Entuity backup utility, e.g. using standard copy and paste commands, you should stop all services including the MySQL database. Conversely, to use Entuity `backup` MySQL must be running.

See the *Entuity User and System Administrator Guide* for details on backing up Entuity.

8 Entuity Maintenance Patches

Entuity Customer Support issue Release Notification and Patch Notification technical bulletins informing customers of new releases, maintenance patches and their content. These notifications are usually the trigger for updating your software.

The process to use when applying a new patch is different to that used when installing a new GA version of Entuity. A patch only includes changes that are applied to an existing installation, Entuity GA is a new ISO image.

This chapter details how to install maintenance patches. To download and install the Entuity GA ISO image see *Preparing to Install Entuity*.

Name	Description
GA	The first release of a new version of Entuity, e.g. Entuity 14.0, is the General Acceptance (GA) release. It is delivered as a compressed ISO image.
Patches	A patch may deliver fixes to issues raised by customers, improved performance and new features. You should always apply the patches in the order they are issued, e.g. one patch may depend upon a change delivered in a previous patch.

Table 22 Entuity ISO Image and Patches

Patch Install Overview

Follow these steps when installing patches:

1) Check the current Entuity version, including patch level, through the Entuity Health page.

   See *Checking the Patch Level of Entuity*.

2) From the Entuity customer support site download the patch file to a temporary location.

   See *Downloading Maintenance Patches*.

3) Stop the Entuity server and take a full backup of the entire Entuity installation. If the patch installation fails it is this entire installation backup that you should restore.

4) Apply the patch using the patch installer, *entuity_home*`\install\installPatch`, for example:

   ```
   installPatch c:\temp\EYE2011.P01.WinNT.patch
   ```

   See *Installing Maintenance Patches*.

5) After installing the patch run `configure`. The patch is only applied once `configure` successfully completes.

6) Restart the Entuity server.

Checking the Patch Level of Entuity

You must always install Entuity patches in the correct sequence. You should also never miss a patch, a subsequent patch may depend on a change in an earlier patch. `installPatch` does check that the patch is sequential with the current patch level of the server.

You can check the patch level of an Entuity server from the Health Summary page:

1) Click **Administration > Entuity Health > Health Summary**.

   Version indicates the Entuity release and patch level of the server. For example:

   - **Entuity 14.0** indicates this is the General Acceptance (GA) release, no patches are applied
   - **Entuity 13.5 (P02)** indicates 2 patches have been successfully applied

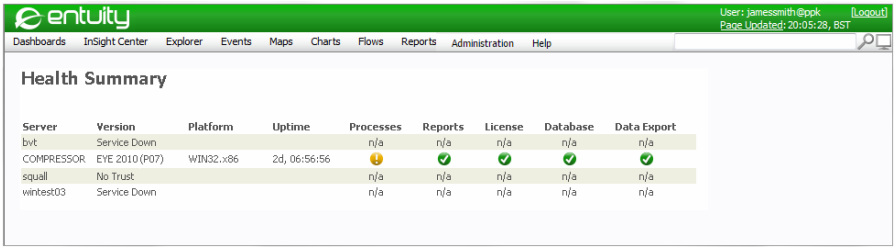

Figure 32 Entuity Maintenance Patch Level

Downloading Maintenance Patches

Entuity Customer Support issue Patch Notifications informing customers through these technical bulletins of new maintenance patches, their content and confirmation of from where you can download them.

To download patches:

1) Login to the Entuity Customer Support site (http://www.support.entuity.com/login.php) to view patch details, or login to the Entuity FTP site to download the patch (ftp.entuity.com).

   When you do not have an account, or have lost your account details contact Entuity Customer Support.

2) Navigate to the required patch.

   Patches are stored by Entuity Release, e.g. `/Patches/13.5/`, `/Patches/13.0/`.

Entuity GA ISO image is also available from the ftp site, but stored under the Images folder, e.g. `/Images/14.0/`.

3) Download to a temporary folder the required patch, associated readme and checksum files.

4) Compare the checksum of the patch against the expected hash value in checksums.txt.

   Linux operating systems include checksum utilities. In Windows environments you require a third party tool that supports SHA-1 or SHA-2 checksum calculation.

Installing Maintenance Patches

You can install patches to Entuity from the command line using the `installPatch` utility. `installPatch` checks the patch is appropriate to the server, for example it's the correct Entuity version, operating system, and also that Entuity is not running. `installPatch` would raise an error if a test is failed (see *installPatch Warning and Error Messages*).

As `installPatch` applies a patch it displays its progress on screen, and reports the success or failure of its operation.

To install the downloaded maintenance patch:

1) Stop the Entuity server and take a backup.

2) From the command line on the Entuity server run *entuity_home*`\install\installPatch` on the downloaded patch. For example with a Windows patch downloaded to the temporary folder `c:\temp`, enter:

   ```
   installPatch c:\temp\ENTUITY_13_5.P02.WinNT.patch
   ```

   Where you have more than one patch to install, you can use `installPatch` in multiple file mode. Enter the patches in sequence, using their full path with only a space between each, for example:

   ```
   installPatch c:\temp\ENTUITY_13_0.P01.WinNT.patch
   c:\temp\ENTUITY_13_0.P02.WinNT.patch
   c:\temp\ENTUITY_13_0.P03.WinNT.patch
   c:\temp\ENTUITY_13_0.P04.WinNT.patch
   ```

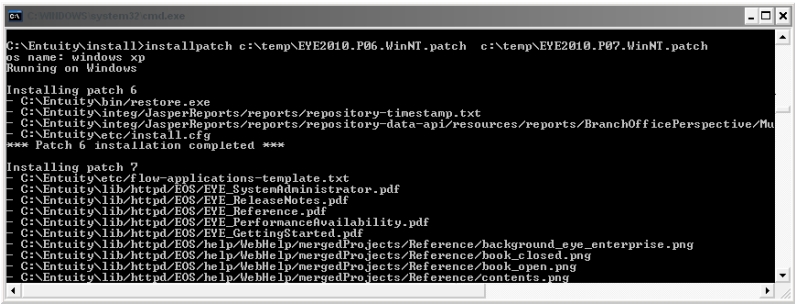

Figure 33 Running installPatch

3) After installing the patch run `configure`. The patch is only applied once `configure` completes.

4) Restart the Entuity server.

installPatch Warning and Error Messages

`installPatch` error and warning messages are displayed to the command line. When checking Entuity version, `installPatch` uses Entuity's internal version number. You can use the following table to identify the Entuity release number from its internal version number.

Release Number	Internal Version Number
EYE 2008	6.0
EYE 2009	7.0
EYE 2009 SP1	7.1
EYE 2010	8.0
EYE 2010 SP1	8.1
EYE 2010 SP2	8.2
EYE 2011	9.0
EYE 2012	10.0.0
Entuity 12.5	12.5.0
Entuity 13	13.0.0
Entuity 13.5	13.5.0
Entuity 14	14.0.0
Entuity 14.5	14.5.0

Table 23 Mapping Entuity Version and Release Numbers

Entuity installation not stopped

`installPatch` checks that the Entuity server is not running before installing the patch. If the Entuity installation has not been stopped `installPatch` displays an error message for example:

```
Port(s) 12321, 5469, 5466, 19194, 5467, 5465, 19193, 162, 12121, 9996,
80, 8082, 8080, 10981, 3306, 20202 are in use

ERROR: The Entuity installation must be stopped before installing this
patch

ERROR: *** Patch installation aborted ***
```

Patch already installed

If the patch has already been installed on the target Entuity server then you will be asked if you wish to re-install the patch:

```
This patch is already installed, do you wish to re-install it [yes/no]
?
```

Patch out of sequence

If the preceding patch has not been installed on the target Entuity server then you will see an error message like this:

```
ERROR: You must install all patches up to patch number 4 before
installing this patch
```

Later patches already installed

If patches later than the patch being installed have already been installed on the target then you will see an error message like this:

```
ERROR: This installation is already patched to level 7
```

Patch is for different Entuity Version

If the patch being installed is for a different version of Entuity to the one installed then you will see an error message like this:

```
ERROR: This patch is for a different Entuity version, Patch is for 8.0
Installed version is 7.1
```

Patch is for a different architecture

If the patch being installed is for a different architecture to the installation then you will see an error message like this:

```
ERROR: Incompatible patch architecture, this patch is for Linux
```

9 Uninstall the Entuity Server

The Entuity server is easily uninstalled from Windows and Linux systems.

Uninstalling from Windows

1) Stop Entuity using `stopeye`, or by stopping the **Entuity** service from the Windows Services dialog.

2) Remove details of the services from your registry, using the inst_service program (found in *entuity_home*`\bin`). From the command line enter:

```
inst_service remove "EOTS"
inst_service remove "EOTS Database"
inst_service remove "EOTSWebserver"
```

`inst_service` uses the service names which all start with EOTS and not the service display names that all start with Entuity.

3) Delete the root folder of the Entuity installation. If the database directory was not installed under *entuity_home* then you will have to separately delete that folder.

If you have called Entuity from any external scripts, or are using Entuity together with other network management software through its integration modules, then you may have files external to these to amend.

Uninstalling from Linux Systems

To uninstall the Entuity servers installed to Linux environments:

1) Stop Entuity by running from *entuity_home*`/bin`:

```
./stopeye
```

2) Delete the root folder of the Entuity installation. If the database directory was not installed under *entuity_home* then you will have to separately delete that folder.

If you have called Entuity from any external scripts, or are using Entuity together with other network management software through its integration modules, then you may have files external to these to amend.

A Entuity Configuration Checklist

Use this checklist before running `install` and `configure`. For each item the checklist includes a description and any default value. Enter your site values as it will assist you during Entuity installation and configuration. You should also:

- Update any firewall and security module control lists to allow Entuity appropriate access to your network.
- Disable anti-virus software from scanning the database directories. Anti-virus software can disrupt the performance of the database, potentially resulting in its corruption.

Item	Description	Default	Site Value
O/S Specific			
MaxUserPort	Registry key value that limits the number of sockets Entuity server can use (Windows only).	Reset to Entuity recommendation: 0x0000FFFE (65534)	
Entuity Directories			
Database Backup Directory	Entuity database backup directory.	`\database\backup`	
Database Directory	Entuity Database directory.	`\database`	
Log Directory	Entuity log files directory.	`\log`	
Network Discovery			
device file	Only required when providing a list of devices for Entuity to add.	`\etc\dev.txt`	
Licensing			
License file	Contains Entuity license details, including Entuity server version, licensed modules. You can temporarily use the evaluation license.	`\etc\license.dat`	
Configuration Monitor (Optional Module)			
Server IP Address	Entuity server IP address.		
Transfer Home	The folder to which the transfer server copies retrieved configurations.	`\cm_transfer`	
Archive Directory	The folder to which Entuity copies configuration files from the transfer folder.	`\cm_archive`	
SSL Settings			
Certificate file	SSL certificate location and name.	-	
Key File	SSL Key location and name.	-	

Table 24 Information Required When Configuring Entuity

Item	Description	Default	Site Value
CA Certificate File	CA certificate location and name (optional).	-	
Ports			
Event Request Listener Port	Event Request Listener IP port on which you want the event management process to listen for incoming requests for events, for example from the event viewer, from subscribed third party integrations.	19193	
Event Receiver Port	Event Receiver IP port on which you want the event management process to listen for incoming requests for events, for example system events, trap-based events, syslog events.	19194	
Database Port	Port on which database server listens.	3306	
Web Server Port	Port on which web server listens.	80	
SSL Web Server Port	Port on which SSL web server listens.	443	
Ticker Port	Port used by Ticker to monitor its client port's activity.	20202	
rpcServerPort	Port used by Tomcat to communicate with the Search tool.	5469	
Tomcat Port	Port used by the Tomcat application server.	8080	
Tomcat Admin Port	Port used to access and manage the Tomcat application server.	8005	
Flow Port	Port on which Entuity receives flow information, i.e. NetFlow, Netstream and JFlow, from devices.	9996	
Flow Management	Port used to manage, e.g. stop, the Flow Collector process.	12121	
Upgrade Configuration Files			
entuity.cfg ...	Files that **MAY** have site specific settings, and which may not be maintained during an upgrade.	Particular changes, and files, vary from site to site.	

Table 24 Information Required When Configuring Entuity

Entuity also uses ports that are not configurable through `configure`.

Port	Description	Default
SNMP Polling	Port used by StormWorks for SNMP access to devices. Configurable through `entuity.cfg`.	161 (UDP)
Syslog Receiver	Port listened on by system logger for syslog messages. Configurable through `entuity.cfg`.	514
Trap Forwarding	Ports used to forward traps by Entuity SNMP trap forwarding. Not configurable.	0 (Any Port)
Trap Receiver	Port on Entuity listens for SNMP traps. Configurable through `entuity.cfg`.	162 (UDP)
search	Port used by the Entuity Search engine. Configurable through `entuity.cfg`.	5469
IPFIX Port	Port on which Entuity receives IPFIX flow information from devices. It is not configurable, if you set a router to export IPFIX packets to another port Entuity would not collect the data.	2055
sFlow Port	Port on which Entuity receives sFlow flow information from devices. It is not configurable, if you set a router to export sFlow packets to another port Entuity would not collect the data.	6343

Table 25 Additional Ports used by Entuity

By default all files and folders are installed below *entuity_home,* the Entuity installation folder.

Reverse the slashes if you are a Linux user.

B Entuity Install and Packages

Entuity `install` installs to folders under *entuity_home* (where *entuity_home* is the Entuity install location):

- Entuity server and client software and documentation.

Product	Version
Apache Tomcat	7.0.70
Apache HTTPD	2.4.23
Groovy Script	2.4
JRE	1.8.0_101
MariaDB Server	10.0.26
MariaDB Library (libmariadb)	2.3.0
MariaDB Java Client	1.2.3
OpenSSL	1.0.2h

Table 26 Third Party Software Versions

- The Entuity database that is a set of MariaDB databases, each with their own folder (by default under *entuity_home*`\database\data`). (See the *Entuity User and System Administrator Guide*.)
- License file, a 30 day evaluation license, i.e. `license.30day.eval.dat`.

  You can apply for a complete license from your Entuity representative. This is the only license you require for Entuity.

  Details of third party software licenses and license terms are installed to *entuity_home*`\licenseTerms`.

C Getting Started with Entuity Overview

This section provides an overview of the install, configure and device management procedures to follow when getting started with Entuity.

Tasks	Actions
Preparing to Install	
Download Entuity	See *Preparing to Install Entuity*.
Review the installation documentation	Release Notes are available from the root of the temporary installation, and once installed the web UI Help. Read *Chapter 2 - Prepare for Entuity Install and Configure*.
Check Entuity server system requirements	Check you are installing to an appropriate machine. In multi-server environments consider the role of each server, e.g. poller, flow collector, consolidation. See *Entuity System Requirements, p9*.
Complete your configuration checklist	Complete the checklist, update any firewall and security module control lists to allow Entuity appropriate access to your network. Also disable anti-virus software from scanning the database directories. See *Appendix A - Entuity Configuration Checklist*.
Obtain your Entuity license	Entuity is supplied with a thirty day evaluation license. For a permanent license contact your Entuity supplier, providing them with the host identifier of the machine to which you want to install the software. In multi-server environments consider the licensing model that you want to implement. *Chapter 6 - Entuity Licensing*.
Installing Entuity	
Install Entuity	Install using the install wizard or from the command line. *See Install Help* and *Chapter 3 - Install the Entuity Server*.
Check for Patches	Maintenance patches are issued at regular intervals. See *Chapter 8 - Entuity Maintenance Patches*.
Configure Entuity	Configure Entuity using the wizard or from the command line. *See Configure Help* and *Chapter 4 - Configure the Entuity Server*.
After You Install	
Backup Entuity	Backup Entuity to provide a clear backup point. *Chapter 7 - Back Up the Entuity Data*.
Start Entuity	Starting Entuity. See *Start Entuity, p58.*
Check your install	Process Health, License Health. See the *Entuity User and System Administrator Guide*.
Set up user accounts	Amend the default user accounts. Set up new user accounts and groups. See *Help available from the web UI*.
Add Inventory to Entuity	Choose method for discovering devices. Add discovered devices to Entuity. See the *Entuity User and System Administrator Guide*.

Table 27 Getting Started with Entuity

Preparing to Install Entuity

Entuity is available as a compressed DVD ISO image. To download and prepare the software for installation you require FTP, data decompression, checksum and ISO image file tools. Entuity do not recommend specific third party tools, although market leaders are easily found through the internet, e.g. search for 'mount iso images' to find ISO image file tools.

To prepare Entuity for installation:

1) From the download site provided by your Entuity supplier download:
   - And read the associated readme file.
   - `checksums.txt` which includes SHA-1, SHA-2 derived checksums for the image.
   - The compressed ISO file.

2) Unzip the compressed ISO file to a temporary, empty location that is on the Entuity server machine, is near the root of the drive and the path does not include spaces.

   Do not, for example in a Windows environment, unzip the file to a shared location on another machine. The unzipped install program does not properly complete across share mappings. Also in Windows use the wizard to extract files, other mechanisms, e.g. copy and paste are not reliable.

3) Compare the checksum of the image against the expected hash value in `checksums.txt`.

   Linux operating systems include checksum utilities. In Windows environments you require a third party tool that supports SHA-1 or SHA-2 checksum calculation.

4) Mount or burn the installation DVD ISO image.

   The Entuity ISO file contains the complete image of an Entuity DVD disc. With the appropriate third party tool(s) you can:
   - Burn the image to a DVD.
   - Mount the image to a virtual drive.

With either the mounted image or newly burnt DVD, you are now ready to install Entuity.

The first release of an Entuity version (GA) is supplied as a compressed ISO image. Entuity maintenance patches are configured for use with `installPatch`, and require a different install process. (See *Chapter 8 - Entuity Maintenance Patches*.)

Installing Entuity

When you have prepared the downloaded Entuity ISO image file (see *Preparing to Install Entuity*), you can use the `install` program to start the installation.

When installing Entuity you should use the full install instructions in *Chapter 3 - Install the Entuity Server*, which also includes how to install from the command line, the only option when installing Entuity to Linux environments.

You should use a user account with administrator access rights and then:

1) Run `install` from the server, e.g. click **Start > Run**, from the Run dialog browse for the image root and select `install`.

   `install` displays Installation Welcome screen. Click **Next**.

2) `install` displays the Entuity license agreement. Read the license agreement.

   Click **Agree** and **Next** to install Entuity.

3) `install` displays the Installation Location page. By default, Entuity is installed to `C:\Entuity` (referred to as *entuity_home*). Accept, or amend the install location.

   Click **Next**. `install` prompts you to confirm the creation of the install folder.

4) `install` displays an installation progress screen.

   Entuity displays the host ID of the server machine. When you want to purchase a license you must provide this identifier to your Entuity supplier. However, you can configure and then run Entuity using the thirty day evaluation license shipped with Entuity.

   When using Entuity as a Central License Server you are only required to provide details of the licensing server, the license for the remote Entuity servers is linked to the central license.

5) You can now check for, and install, Entuity maintenance patches. (See *Chapter 8 - Entuity Maintenance Patches*.)

Configuring Entuity

The options available with `configure` vary according to the selected capabilities of the Entuity server, i.e. Standard Server or All-in-one.

When configuring Entuity you should use the full instructions in *Chapter 3 - Install the Entuity Server*, which also includes how to configure Entuity from the command line, the only option when installing Entuity to Linux environments.

To configure Entuity:

1) From *entuity_home*\`install` double-click on `configure`. `configure` checks that Entuity is not running, and would display a warning message if it were.

2) In Windows environments when the registry key value *MaxUserPort* is not set to 0x0000FFFE (65534), then it should be amended. You can do this manually, or permit `configure` to amend *MaxUserPort*. Click **Next**.

3) In the Choose Configuration Folders page specify the database installation, database

backup and log file folders.

Specify the folders and click **Next**.

4) `configure` displays the host identifier of the Entuity server, which your Entuity contact requires to generate a valid license.

   Enter the Entuity license file location and name and then click **Next**.

5) `configure` displays the server capabilities page from which you can set the type of server, i.e. Standard Server, All-in-one.

   Select the Entuity server capability and then click **Next**.

6) `configure` displays a list of modules.

   Use the check box to activate modules and click **Next**.

7) When you have activated modules that require further configuration, e.g. Configuration Monitor, High Availability, `configure` displays the appropriate module configuration pages.

   Define the module and click **Next**.

8) `configure` prompts for SMTP Server details. You must only complete these details when you want to send email notifications when events are raised or when reports are generated.

   Specify the SMTP Server, and when required user name and password. Click **Next**.

9) `configure` displays the Security configuration page.

   Select **Use SSL Communication** to activate SSL for sessions between your Entuity server and browsers. You must provide your own SSL certificates.

   Select **Change Database Root Password** when you want to enter a new root password.

   Specify your SSL certificate and key files and click **Next**.

10) `configure` displays the Ports Configuration page. Select:

    - Use pre-selected port numbers, to accept the default port settings.
    - Modify port numbers, to display the Modify Ports page.

    Click **Next**.

11) When you selected Modify port numbers, `configure` displays the current list of ports. Port numbers that have a green background are valid, ports with a red background indicate a port conflict that requires attention.

    Amend port settings and click **Next**.

12) `configure` displays a summary of your configuration settings. This is the final opportunity to amend, or cancel, your Entuity configuration selections.

    Click `Configure` to start Entuity configuration.

13) `configure` displays a progress page and indicates when configure completes.

You can:

- Take an initial backup of the system. (See *Chapter 7 - Back Up the Entuity Data*.)
- Start Entuity. (See *Chapter 5 - Startup, Shutdown and Process Checking*.)
- When using Entuity Central License Server assign device and object credits to its remote Entuity servers. (See *Chapter 6 - Entuity Licensing*.)
- Discover your network. (See the *Entuity User and System Administrator Guide*.)

Adding Devices to Entuity

When running Entuity in a consolidation or dedicated flow collector role you do not use that server to manage devices. However for servers you want to manage devices, after starting Entuity for the first time:

1) From a web browser using user account **admin** and password **admin** log into the Entuity web UI.

   The Entuity server URL has the format http://*Entuityhost:port*/, or where SSL is enabled https://*Entuityhost*:*port*/, where:

   - *Entuityhost* is the IP address or resolvable name of the Entuity server.
   - *:port* is only required when not using the default port, 80 and 443 respectively.

2) Entuity displays the default Inventory page, also accessed through **Administration > Inventory**.
3) From the Inventory page you can:

   - Use **Auto Discovery** to automatically discover devices within set parameters.
   - Add individual devices.
   - Use a seed file to add devices defined within it.

   Discovered devices are returned as candidates ready for you to add to Entuity.

4) From the inventory candidates list, click **Add to Inventory.** Entuity manages the devices.
5) From the Inventory page you can view the devices under Entuity management.

Virtual machines should be added to Entuity using the VM Platform device type, which has a distinct set of connection parameters to all other device types. (See the *Entuity User and System Administrator Guide*.)

D Entuity Server Sizing

Sizing of Entuity servers is dependent on different aspects of the monitored network environment. Device interface density, SNMP agent response times, network latency and other external factors will affect the maximum number of devices a server can support. It is always recommended that you seek advice from an Entuity technical representative when specifying your server configuration.

The following chart and tables indicate reasonable server specifications.

Server Sizing

You can install Entuity to both physical and virtual machines, the hardware requirements are the same for both. (For a list of supported virtual machines see *Virtual Machines Certified to Host Entuity*.)

The number of devices and the number of ports (i.e. physical and virtual interfaces) are the two key loading factors. They are inversely related; the maximum number of devices that can be managed without effecting performance characteristics is inversely proportional to the total number of objects. You can use the chart to plot your device-port combination and the intersection identifies which sizing category banding is best for your server requirements, Low, Intermediate or High.

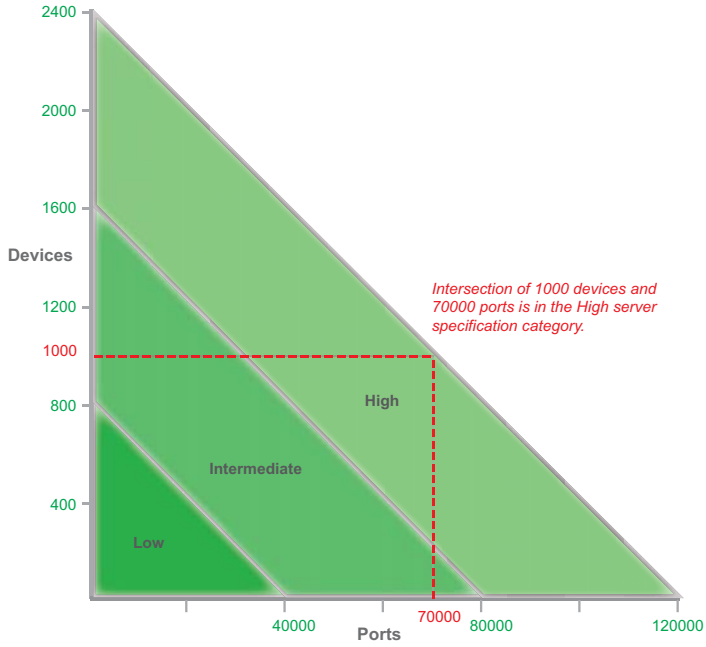

Figure 34 Entuity Server Specification Categories

To size your server:

1) Choose an Operating System. Entuity supports:

   - Microsoft ® Windows Server 2012 R2 (64 bit only)
   - Microsoft ® Windows Server 2012 (64 bit only)
   - Microsoft ® Windows 2008 SP2 (64 bit only)
   - Microsoft ® Windows 2008 R2 (64 bit only)
   - Red Hat Enterprise Linux Server release 6.x
   - Oracle Enterprise Linux Server release 6.x.

2) Choose the role of the server (see *Entuity Server Roles*), for example a server acting as a:

   - Central License Server and not managing devices would have a low category server specification. A Central License Server allows you to control licensing of all of your Entuity servers from one central server. This makes it very easy to move device licenses between servers when required.
   - Consolidation Server and not managing devices would have a low category server specification. In a multi-server environment users can log on to an Entuity Consolidation Server Consolidation Server to access information gathered and stored by multiple polling Servers.
   - Polling Server faces the most significant loading factors as the number of devices and the number of ports. You can use the chart to identify the most suitable server configuration based on managed device and port numbers. If the server's role is to act additionally as a Central License Server, a Consolidation Server or a Flow Collector (as well as a Polling Server) it is recommended that a faster processor clock speed (closer to 3GHz) is selected.
   - Flow Collection Server is accommodated within the recommended server configurations. If the server's only role is to act as a Flow Collector (without polling) you can identify the server configuration from the chart using a port count of zero.

3) Estimate how many devices and ports you want the server to manage.

   You should only include to your estimate devices which you intend to SNMP poll, Ping Only devices have a limited impact on server resources (Entuity uses ICMP to only poll their management IP addresses).

4) Apply these figures to the sizing chart. The intersection determines within which device-port banding the server falls, low, intermediate or high.

5) *Table 28 Minimum Server Specifications* provides a by component breakdown of the minimum requirements for each of the device-port management bands.

Server Component	Low	Intermediate	High
Minimum CPU Clock Speed	2.5 GHz	2.5 GHz	2.5 GHz

Table 28 Minimum Server Specifications

Server Component	Low	Intermediate	High
Intel Processor Family (or equivalent)	Xeon E3 Family	Xeon 5000 Sequence	Xeon E5 Family
Minimum No Cores	4	6	12
Windows Minimum Physical Memory	6 GB	12 GB	24 GB
Linux Minimum Physical Memory	8 GB	16 GB	32 GB
Disk Capacity	60 GB	90 GB	120 GB

Table 28 Minimum Server Specifications

Server Configuration Components

Table 28 Minimum Server Specifications details 3 minimum server configurations for installations where the combination of devices and ports under Entuity management is considered low, intermediate and high respectively. The relationship between Entuity server performance and the different components of the machine on which it is installed is critical when developing a machine specification. Key components are:

- CPU Clock Speed. The time to process certain functions, for example to display a web page, generate reports, are governed by the speed of single threaded operations. The faster the clock speed the faster single threaded operations are processed. Therefore server clock speed will most noticeably affect the responsiveness of the user interface.

  Entuity Support recommend that the servers have a minimum clock speed of 2.5 GHz and ideally have speeds nearer 3.0 GHz.

- Number of CPU Cores. The number of CPU cores governs how many multi-threaded operations can take place simultaneously. Entuity's polling engine has a multi-threaded architecture and therefore its polling capacity and data throughput increases with the number of available CPU cores. The relationship between polling capacity and cores is not linear; more cores have greater contention for shared system and application resources.

  Entuity Support have determined that there are only small gains to be made by increasing beyond 12 cores.

- Memory. It is important that the memory requirements of Entuity's running processes can be accommodated in physical memory. System performance is severely impacted when physical memory is exhausted and process memory allocations are paged to the disk. In addition there are benefits to be gained by having extra spare memory, since this will be used by the operating system to cache disk information which can improve database performance.
- Disk Capacity. Minimum disk space requirements cover Entuity's installed software, its embedded database and storage for standard usage of scheduled reports.

  Entuity Support recommend a SCSI Ultra 320 or SAS disk sub system for physical servers, preferably with separation of disk I/O generated by memory swapping from

database traffic. Therefore the operating system and swap partition should be located on one physical disk with Entuity including its database on another.

RAID 5 is not recommended as physical disk synchronization issues seem to cause high latency. RAID 1 (mirroring) is acceptable but must be a hardware implementation.

- Disk Performance: Entuity's database relies on fast throughput of data to the storage system. We recommend that systems are configured with the fastest storage system options available.
- As a guide we suggest that disk rotational speeds should be no slower than 15Krpm, and Input/Output Operations Per Second (IOPS) is rated at 150 or above.

Amend Server Configuration Components

You can amend the default configuration of an Entuity server through *entuity_home*`\etc\entuity.cfg`. After amending `entuity.cfg` you must first run `configure`.

Before amending the configuration you should first read the section on `entuity.cfg` in the *Entuity System Administrator Reference Manual*; changing a setting, for example `Database.key_buffer`, without the appropriate hardware components can seriously impact server performance.

When a server resource requirements are within the:

- Low category you should not have to amend default configuration settings.
- Intermediate category you could amend:

```
[Database]
key_buffer=1024M

[MibServ]
workers=40
```

- High category you could amend:
  - For Linux installs:

```
[Database]
key_buffer=3072M
table_cache=3072
```

  - For Windows installs:

```
[Database]
key_buffer=1024M
```

  - For all operating systems:

```
[DataStream]
NumStreamInstTables=4
```

```
NumSampleCaches=8!
CacheStreams=100000

[MibServ]
workers=60

[eyepoller]
workers=50

[eosserver]
javaMemory=3072M
```

Glossary

802.1p

An IEEE standard for providing quality of service (QoS) in 802-based networks. 802.1p uses three bits (defined in 802.1q) to allow switches to reorder packets based on priority level. It also defines the Generic Attributes Registration Protocol (GARP) and the GARP VLAN Registration Protocol (GVRP). GARP lets client stations request membership in a multicast domain, and GVRP lets them register into a VLAN.

AAL (ATM Adaptation Layer)

AAL enhances the service provided by the ATM layer to a level required by the next higher layer. It performs the functions for the user, control and management planes and supports the mapping between the ATM layer and the next higher layer.

Advanced Actions

Advanced Actions, also known as user menus and user actions, are defined through configuration files. Actions may be automatically triggered through Entuity raising an appropriate event, or interactively through advanced action menus, available both from the menu bar and context menus.

Agent

Intelligent management software embedded in a network device. In network management systems, agents reside in all managed devices and report the values of specified variables to management stations.

Antenna / Radio

Each Wireless Access Point has one or more Antennas. Each Antenna is attached to an 802.11 radio within the Access Point. Wireless Hosts communicate with the network via a wireless association with an Antenna/Radio. Each Antenna/Radio can have multiple hosts simultaneously attached. Each Antenna/Radio operates in a chosen 802.11 compatibility mode such as 802.11a, 802.11b or 802.11g. Additionally, each Antenna/Radio has a single SSID assigned. Each Antenna/Radio operates on a chosen radio channel and with a specified transmit power setting, which is measured in mW. Many controller based installations use dynamic optimization algorithms to pick a suitable channel and power setting. Frequent auto-adjustment of these setting indicates that there are problems being encountered with the quality of the wireless communications.

AP (Access Point) / WAP (Wireless Access Point)

A device that has one or more 802.11 radios and Wireless Antennas. For example, laptops, PDAs, connect to a wired LAN through an AP, which is a hardware device or software that acts as a communication hub.

It bridges traffic from wireless attached hosts to/from an Ethernet interface that connects to an access layer switch port. APs provide heightened wireless security and extend the physical range of a wireless LAN. The access layer switch will see the MAC addresses of the individual wireless attached hosts (the MAC address of the wireless NICs) plus the MAC of the Access Point Ethernet interface.

AR System

BMC Remedy Action Request System (AR System) is a framework within which applications are built by AR System administrators. Applications consist of a set of AR System forms that are linked using workflow rules designed for the application. These forms contain fields which Entuity can be configured to populate.

ARs

Entuity integrates with AR System to generate Action Requests (ARs). The sample integration with the Remedy Help Desk includes ARs of the type incident.

ARP

ARP (Address Resolution Protocol) is the layer 2 standard for TCP/IP. It is used to obtain a node's physical address when only its logical IP address is known.

ATM

ATM (Asynchronous Transfer Mode) is a packet-switching technology, that delivers high-speed performance together with a scalable architecture. Its use of small packets (fixed length cells of 53 bytes), provide for low latency so sound and vision arrive together. It can also handle bursty, non time-sensitive data, translating variable length packets to fixed size packets.

Attribute

In Entuity an attribute is a property of an object that is defined through StormWorks. Attribute data can be charted using the Attribute Grapher and is available to Report Builder.

Autonomous Wireless Access Point (AWAP)

A Wireless Access Point (WAP) that embodies all of its necessary control functionality in a self-contained manner. AWAPs are usually connected to switched access layer ports and can coexist with ordinary wired connections to end user hosts and servers on the same switch. AWAPs do not require wireless controllers and do not interact with them if they exist.

Backbone

The part of a network that acts as the primary path for traffic that is most often sourced from, and destined for, other networks.

BECN (Backward Explicit Congestion Notification)

BECN is a bit in the header of a frame-relay frame that is set when frames are sent on the data path backwards from destination to source. It indicates congestion to the source node.

Frame Relay functionality combines BECN and FECN values to determine congestion on a data path.

Bandwidth

The upper limit of the rate at which data can be transferred.

BMC Atrium CMDB

The BMC Atrium Configuration Management Database (BMC Atrium CMDB) is a data repository that provides a working model of your enterprise IT infrastructure.

BMC Cell

BMC Impact Manager instance. A cell receives events from Entuity and displays them in the BMC IX.

BMC II Web Services Server

BMC Impact Integration Web Services Server. You can connect to the BMC II Web Services at the end point as defined by the URL format, http://*webServerHostName*:*webServerPortNumber*/*webServiceName*, e.g. http://decade:6080/impactManager.

BMC IX

BMC IX (BMC Impact Explorer) displays events received from Entuity.

BMC ProactiveNet Performance Management

BMC ProactiveNet Performance Management which receives events from Entuity.

Blackout

Blackout is complete loss of the network, as opposed to a brownout, which is degradation in the performance of the network.

BPDU

Bridge Data Protocol Units are special frames that contain spanning tree information. There are two types of BPDU, Topology Change Notification (TCN) BPDU contains topology change information, Configuration BDU contain configuration information.

Bridge

A device that interconnects local or remote networks. Bridges form a single logical network, centralizing network administration. They operate at the physical and link layers of the OSI Reference Model.

Brownout

Brownouts, also known as soft faults, are typically caused by cabling faults, faulty transceivers, faulty NIC cards and configuration errors such as duplex/half-duplex mismatches. These problems cause a percentage of the packets traversing that particular area of the network to be corrupted. The total number of packets discarded as a percentage of packets is directly related to the severity of the brownout.

Burst

Burst is the access rate of the physical connection to the Frame Relay carrier network.

Central Server

A central server is an Entuity server trusted by remote Entuity server(s). A user logged into the central Entuity server is able to view information collected by the remote Entuity server(s), according to their user account access rights. A remote Entuity server responds to requests from a trusted central Entuity server, and freely shares information with it.

An Entuity server can be configured to perform both roles, be both a remote and central Entuity Server. This allows administrators to create both hub-n-spoke and fully meshed deployments.

A central Entuity server can also act as a central license server. From it you can allocate, and de-allocate, license credits to its remote servers.

Configuration of central and remote servers is through the Multi-Server Administration area of the Entuity web UI.

CDP (Cisco Discovery Protocol)

CDP is primarily used to obtain protocol addresses of neighboring devices and discover the platform of those devices. CDP can also be used to show information about the interfaces your router uses. CDP is media- and protocol-independent, and runs on all Cisco-manufactured equipment including routers, bridges, access servers, and switches.

Entuity uses CDP as a method when maintaining links on maps and identifying trunk ports.

CI

Within BMC Atrium CMDB a Configuration Item (CI) is a collection of objects related to the specific functionality of a larger system.

CIR

Committed Information Rate is the rate (in bps) that the network agrees to transfer information over a permanent virtual circuit (PVC) in Frame Relay. The CIR applies to the rate of data entering the network.

Cisco IOS IP SLA Operations

Cisco IOS IP SLA Operations are created on devices by Entuity (via SNMP). Entuity currently fully supports DHCP, DNS, HTTP, HTTP Raw, ICMP Echo, ICMP Path Echo, TCP, UDP Echo, UDP Jitter and UDP Jitter VoIP operations. Entuity can also monitor operations other than these ten, for example FTP. The completeness of the returned data depends upon how close the operation's data structure corresponds to Entuity's default representation of the IP SLA operation data structure.

These are the ten fully supported operations:

- DHCP, Verify availability of dynamic IP addresses.
- DNS, DNS server functionality check.
- HTTP, Web page availability.
- HTTP Raw, Web page availability.
- ICMP Echo, Simple connectivity tests.
- ICMP Path Echo, Simple connectivity tests.
- TCP, Connect Application availability.
- UDP Echo, Simple connectivity tests.
- UDP Jitter, Detailed latency measurements (requires IP SLA on both devices).
- UDP Jitter VoIP, Detailed latency measurements (requires IP SLA on both devices).

Client

A computer that requests a service from another. In Entuity the Java client is Component Viewer which requests, for example, information from the Entuity server on the devices on your network.

Collisions

Collisions occur when two transmitters attempt to send data at the same time. The greater the number of collisions the poorer network performance appears.

Component Viewer

Component Viewer is the Entuity Java client, available through the web UI Tools menu. Through it you can quickly scan the network for both current and historical performance

data. It creates an intuitive hierarchy which lets you easily view configuration settings, check status information and launch fault, utilization and traffic volume history graphs.

Context Menus

Context menus are available from the Entuity web UI and Component Viewer. The contents of the menu are dependent on the position of the mouse when you clicked the right button.

Core Ports

Entuity considers core ports, as WAN ports, administratively up ports which have a configured IP addresses (i.e. layer 3 ports) on devices which are routers or have router capability, or trunks and uplinks that are administratively up.

By default the port status event, Port Operationally Down, is only enabled for core ports.

Current Configuration

The device configuration (either startup- or running) currently being processed.

DLCI (Data Link Connection Identifier)

A unique logical identifier assigned to a PVC end point in a frame relay network. It identifies a particular PVC endpoint within a user's access channel therefore allowing multiple connections to many destinations over a single, physical channel.

Data Management Kernel (DMK)

The DMK supports Entuity's intelligent discovery function. It includes out of the box data models for a wide range of managed devices including hundreds of Ethernet switches and routers. These customizable data models define the attributes of each managed element, its possible dependencies in relation to other elements of the network, and the specific details to retrieve for each element. The DMK manages these data models and automatically applies updates and changes to the Entuity database schema.

Data Path

A data direction on each PVC is a data path. For example, a PVC that connects points A and B has two data paths, from A to B and from B to A. Frame Relay functionality analyzes the data paths separately.

Data Rollup

Data Rollup is a method of taking polled data and bundling it into larger more manageable units, e.g. rolling 24 hourly datapoints into one daily sample. If Entuity generated monthly reports from live polled data then this would cause a significant increase on the processing overhead, i.e. instead of one datapoint for each day there would be hundreds.

DE (Discard Eligibility)

DE is a bit in the header of a frame-relay frame that indicate the frame may be discarded in preference to other frames if congestion occurs. It is usually set by a network node if the user is offering data (frames) at a higher rate than has been negotiated. This maintains the committed quality of service within the network. Frames with the DE bit set are considered to be excess data.

Derived Events

IA derived event is an event derived from an existing event definition. It retains the event identifier of the original definition, unlike a custom event which has its own unique identifier. Derived events are defined as part of an action. They useful for adding additional information to an incoming event, and can also be called from an incident.

Devices

In Entuity devices refers to network devices, for example switches and routers.

Device Support Datasets

Device support datasets define the attributes of each managed element, its device type, its possible dependencies in relation to other elements of the network, and the specific details to retrieve for each element. This comprehensive library streamlines modeling and ultimately shows exactly what you own, where it is deployed and how it is connected.

Datasets are available through these types of vendor files, all have a .vendor extension. These vendor files are, listed in ascending order of priority:

- `newbin.vendor`, which is created in *entuity_home*\etc when Entuity discovers devices with sysoids for which there is not a device support dataset. These generic device support datasets should be considered temporary definitions, and only used until Entuity supply an appropriate vendor file.

  Device support datasets in `newbin.vendor` have the lowest priority when Entuity is determining which vendor device definition to use to manage a device type.

- `bin.vendor` has the second lowest priority when Entuity is determining the source of device information.Device support datasets in bin.vendor have the second lowest priority when Entuity is determining which of those available to use to manage a device type.
- exotica vendor files are installed to *entuity_home*\`etc\exotica`. Exotica files are only used by Entuity when they are copied to *entuity_home*\`etc`, either manually or during Entuity configuration, e.g. when selecting a module.

  Device support datasets in exotica vendor files have the highest priority when Entuity is determining which vendor device definition to use to manage a device type.These files use a simple naming convention, using the vanilla filename, with a plus sign in the filename and identifying name, e.g. `SOLSERV+managed Host.vendor`.

  During Entuity upgrades configure identifies and removes exotica files from the installation that are now part of the updated bin.vendor.

`vendinfo` identifies the vendor device support datasets available to Entuity and the decisions made when more than one vendor file is available for a particular sysoid; which device support dataset Entuity uses to manage that device type (as identified through its sysoid).

Device Types

In Entuity every device has a type, which you can view through the web interface and Component Viewer. The device type is derived from its vendor file information, and helps to determine how Entuity manages a device. Device types include hubs, switches and routers. There are also two Unclassified device types, Basic Management and Ping Only, and also Full Management.

Unclassified device types have two distinct roles:

- Basic Management and Ping-only, is used for those devices Entuity has taken under management at the Basic Management and Ping-only level.
- Full Management, is used for those devices Entuity has taken under management at the Full level but for which there is no vendor file information but Entuity can generate a suitable generic device type. These are uncertified devices.

Domains

Domains and domain filters are terms used within Component Viewer, in fact supplied domains are now only used within Component Viewer to group objects in its Explorer tree, e.g. the routers domain. In the web UI, where you manage views In Entuity, domain filters are referred to by the more apt term view content filters as they determine the type of object that can potentially appear in a view.

DHCP Operation

The IP SLA DHCP operation measures the round trip time (RTT) taken to discover a DHCP Server and obtaining a lease from it. After obtaining an IP Address, Cisco IOS IP SLA releases the IP address that was leased by the server.

The Dynamic Host Configuration Protocol (DHCP) is an Internet protocol for automating the configuration of computers that use TCP/IP. DHCP can be used to automatically assign IP addresses, to deliver TCP/IP stack configuration parameters such as the subnet mask and default router.

Drop Box

Drop box acts as a temporary repository for objects, for example gauges, charts, links, device metrics, that you want to include to new reports, dashboards.

Duplex

A full-duplex link with one telegrapher at each end, transmitting alternately in each direction.

Dynamic Thresholds

Dynamic thresholds enable Entuity to alert the user to deviations from what Entuity's previous polling has established as normal behavior for that hour on that day. Entuity establishes normal behavior for a given attribute on a given port by maintaining the last four weeks worth of polled data, and applying an averaging algorithm.

EIR

The Excess Information Rate (EIR) is the sustainable rate of information in excess of CIR, that the network will deliver if there is available bandwidth. The total information rate is CIR + EIR.

Frame Relay allows data rates in excess of the CIR to be successfully used on occasions. It is also possible that the amount of data that can be transferred per measurement interval (Tc) may be limited to less than the burst (or access rate) of the physical connection to the carrier network.

EIR defines how many bits per second beyond the CIR the data rate may be exceeded. This is may be policed by the carrier ingress switch per Tc on a pro-rata basis. This means that although data can be transmitted for periods of time at the burst rate of the physical port it would not be possible to continue transferring data at this rate successfully on a continuous basis if the CIR+EIR were to be less than the burst rate.

Entuity

Entuity is both the name of the network management software and the company producing it. Entuity software is designed for networks of any size and complexity, from the smallest, simplest corporate infrastructure to the largest multinational. Every customer can access the full functionality of our cornerstone solution, incorporating fault, performance and inventory management.

entuity_home

entuity_home is used within the Entuity documentation to indicate the Entuity server's root folder. The root folder is set by Entuity `install`, in Windows environments the default is `C:\Entuity`. You can view its current setting through *destination* in *entuity_home*`\etc\entuity.cfg`. Within Entuity configuration files it is represented by the variable *ENTUITY_HOME.*

Ethernet

IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. Forms the underlying transport vehicle used by several upper-level protocols, including TCP/IP and XNS.

Events

Events are alerts and alarms that are generated through Entuity monitoring the network. Event Viewer displays events and they can also be reported on.

Expect

Expect is a Unix automation and testing tool, written by Don Libes as an extension to the Tcl scripting language, for interactive applications such as telnet, ftp, passwd, fsck, rlogin, tip, ssh, and others. It uses Unix pseudo terminals to wrap up subprocesses transparently, allowing the automation of arbitrary applications that are accessed over a terminal. With Tk, interactive applications can be wrapped in X11 GUIs.

Eye of the Storm® (EYE)

Until Entuity 12.5 the software was known as Eye of the Storm (EYE).

Entuity Remedy AR System Integration

The Entuity Remedy AR System integration allows forwarding of event and managed object information from Entuity to one or more AR System servers.

Entuity allows two types of forwarding:

- automatic generation of Action Requests (ARs), derived from Entuity events, to particular application forms on target AR System servers
- interactive generation of Action Requests (ARs), initiated from Entuity. The specified application forms on target AR System servers are opened for editing, with default data populated from the current Entuity managed object(s) or event(s).

Entuity can also pass to AR System a URL identifying the managed object that is the source of the AR. From AR System you can open Entuity's Component Viewer with the focus on the managed object.

Factory Default

The shipped values of event thresholds are the factory defaults. You can amend a factory default, which if done at the root level effectively changes the default value for all objects against which that threshold can be set. For example, if you amend a threshold setting for a device event at the Entuity (system) level, all devices on that server will have a new default value.

FEC

Forwarding Equivalence Class (FEC) is central concept to MPLS. An FEC is a set of packets that a single router forwards to the same next hop, using the same interface and with the same handling (e.g. queuing). The FEC is determined only once, at the ingress to an LSP, rather than at every router hop along the path.

FECN (Forward Explicit Congestion Notification)

FECN is a bit in the header of a frame relay frame that is set to indicate to the destination node that congestion is occurring on the network. Frame Relay functionality combines BECN and FECN values to determine congestion on a data path.

Filters

Filters in Entuity act by filtering in those objects specified in the filter. There are three types of filters, view, event and Flex Report.

Entuity uses these types of filter:

- View content filters are applied to the views, restricting the components available from a view to those that meet the criteria.
- Event Filters restrict the events available through a view.
- Flex Report filters restrict the data included to the report.

Flow Collector

The Flow Collector is the set of processes within an Entuity Integrated Flow Analyzer responsible for the receiving, processing and storage of flow records.

Administrators can enable/disable an Entuity server's Flow Collector through `configure`, a decision which should be made according to the role the administrator wants the server to perform in the management of the network.

Frame Relay

A fast packet protocol that relies on physical component and higher level software reliability. The network discards any frame with bit errors. Frame relay services include PVCs (Permanent Virtual Circuit) and SVCs (Switched Virtual Circuit).

Full Duplex

A full-duplex link with one telegrapher at each end, transmitting alternately in each direction.

Generic Device Type

Entuity uses the concept of an underlying generic object against which are mapped the characteristics of different device types, e.g. routers, switch, firewalls, BladeCenters. This allows complete management of devices that have characteristics of one or more of the traditional types of devices, e.g. a router with switching capabilities.

Half-Duplex

A type of communication channel using a single circuit which can carry data in either direction but not both directions at once.

Host Identifier

Your Entuity representative requires the host identifier of the Entuity server machine before they can generate your license. The host identifier associates the Entuity license with the physical footprint of the machine. Entuity install and configure programs both display the host identifier, alternatively you can run the command line program `hostIdent` (which is included with the software but is also available from the Support website).

Hot Standby Router Protocol (HSRP)

Hot Standby Router Protocol (HSRP) establishes a framework between network routers to achieve default gateway failover if the primary gateway becomes unavailable in close association with a rapid-converging routing protocol like EIGRP or OSPF. By multicasting packets, HSRP sends its hello messages to the multicast address 224.0.0.2 (all routers) using UDP port 1985, to other HSRP-enabled routers, defining priority between the routers. The primary router with the highest configured priority will act as a virtual router with its own IP and MAC address, which the hosts on the local segment will be configured to use as a gateway to the destination in question. If the primary router should fail, or the link to the destination drop, the router with the next-highest priority would take over communications through alternative routes within seconds, without major interruption to network connectivity.

HSRP and VRRP on some routers have the ability to trigger a failover if one or more interfaces on the router go down. This can be useful for dual branch routers each with a single serial link back to the head end. If the serial link of the primary router goes down, you would want the backup router to take over the primary functionality and thus retain connectivity to the head end.

Hypervisor

A hypervisor, also called virtual machine monitor (VMM), allows multiple operating systems to run concurrently on a host computer. The hypervisor presents to the guest operating systems a virtual operating platform and monitors the execution of the guest operating systems. Multiple instances of a variety of operating systems may share the virtualized hardware resources. Hypervisors are installed on server hardware whose only task is to run guest operating systems.

Infrastructure Ports

Entuity considers infrastructure ports, as:

Entuity considers infrastructure ports, as router ports, as uplinks which are ports connecting routers with switches and as trunk ports which are ports connecting switches together.

- Router ports.
- Uplinks, ports connecting routers with switches.
- Trunk ports, ports connecting switches together.

Interface

This is the entity on a node which is polled, such as a physical port. Nodes are likely to have more than one interface.

IP

In TCP/IP, the standard for sending the basic unit of data, an IP datagram, through the Internet.

IP Link

IP links may be autoDiscovered or created manually. They represents a link of some form at layer 3 or above e.g. a pair of IP addresses, an IP address and a URL.

IP Peering

IP Peering provides visibility into your WAN links, i.e. leased line, Frame Relay DLCIs, ATM VCCs, using subnet masking. It also reflects any manual IP pairings you may have made in Entuity.

ISO

International body that is responsible for establishing standards for communications and information exchange; developed the OSI reference model. ISO is not an acronym, but the Greek word for "equal."

Java Web Start

A technology for simplifying deployment of Java applications. It allows you to download and launch the Entuity client from your Web browser or shortcuts placed on your PC.

Key Metrics Gauge

From Entuity's Explorer you can access the Device and Port Summary pages, both of which display Key Metric graphs. Key metrics vary according to the managed object, e.g. Device CPU utilization, Port Inbound Utilization%.

These graphs are of two forms a:

- green only gauge is used with metrics that do not have thresholds.
- green and red gauge is used with metrics that have thresholds. When the indicator is pointing to the red area then the threshold has been crossed. The relative size of the red and green areas of the gauge is fixed, i.e. the red area does not take a larger or smaller proportion of the total area of the gauge on changes to the threshold level.

  You can view the current threshold value by passing the cursor over the data value below the graph.

You can click on each key metric gauge to view a larger graph.

LAP (Lightweight Wireless Access Point)

A low cost Wireless Access Point (WAP) that delegates much of the control functionality usually embodied within an Autonomous WAP to a WC. LAPs are usually connected to switched access layer ports and can coexist with ordinary wired connections to end user

hosts and servers on the same switch. The associations between the LAPs and WCs are negotiated dynamically and can change under fault conditions.

A LAP is an AP that is designed to be connected to a wireless LAN (WLAN) controller (WLC). The LAP provides dual band support for IEEE 802.11a, 802.11b, and 802.11g and simultaneous air monitoring for dynamic, real-time radio frequency (RF) management. In addition, Cisco Aironet 1000 Series LAPs handle time-sensitive functions, such as Layer 2 encryption, that enable Cisco WLANs to securely support voice, video, and data applications.

Entuity Wireless currently supports Cisco LAP, part of the Cisco Unified Wireless Network architecture.

Leased Line

A leased line is a dedicated point-to-point connection over a WAN via a router at the subscriber's premises to the telecommunications provider.

Entuity identifies a leased line, by default, when both of these conditions are true:

- The interface type is either IANAifType 22 (propPointToPointSerial) or 23 (PPP).
- The WAN port is not:
- A Frame Relay port.
- An ATM port.
- An ISDN port. These are identified as having an associated lower layer protocol port (found from the ifStack table) of ifType 81 (ds0). This indicates the port is a layer on top of either basic rate or primary rate ISDN.

Link Layer Discovery Protocol (LLDP)

The IEEE 802.1AB Link Layer Discovery Protocol (LLDP), provides a solution for the configuration issues caused by expanding LANs. It runs over the data link layer and specifically defines a standard method for Ethernet network devices to advertise information about themselves to other nodes on the network and store the information they discover. LLDP is available as a technology link type on the Entuity maps.

Load Balancers

Load balancers are devices that control and optimize traffic flow over your network. For example directing traffic away from over utilized servers to those less utilized, improving mission critical service delivery, providing fall over protection.

Entuity delivers a similar level of fault, performance and inventory management for load balancers as provided for other standard Entuity device types, e.g. routers, switches, hubs. For example device reports include load balancers, you can build your own reports using Flex Reports, device and port events apply and full load balancer details are viewable through Component Viewer.

Entuity currently manages F5 Labs Big IP 6400 Load Balancer. Entuity delivers additional polling of the device ports using F5 lab's propriety MIB, returning additional port identification, port status, port traffic and port utilization data. The full integration of this

additional data within Entuity allows administrators to set up utilization and traffic events against this data.

Log Files

Entuity process messages are written to their individual log files, in *entuity_home*/`log`. For example, `applicationMonitor` writes to `applicationMonitor.log`. When the log file becomes full, it automatically wraps to another file with up to four versions, e.g. `applicationMonitor.log.1`, `applicationMonitor.log.2`, `applicationMonitor.log.3`.

Management Level

Every device under Entuity management is managed according to its management level, which is set when the device is added to Entuity but can be subsequently amended. Each managed device costs one license object.

These are the management levels:

- Full Management (all interfaces), Entuity manages all interfaces on the device.
- Full Management (management interfaces only), Entuity only manages the management interface.
- Full Management (no interfaces)
- Basic Management Entuity collects only basic system information and the full IP address table via SNMP. This management level is used when Entuity does not have the appropriate device support dataset (vendor file), cannot generate an appropriate dataset or you only want the device placed under basic management. Entuity does not manage any ports or modules on the device.
- Ping Only, devices only under ping management, SNMP data is not collected for these devices.

Managing Agent

Handles requests for information or action from the management station on a node. A protocol links the management station and the Managing Agent; for Entuity users this must be SNMP.

MIB (Management Information Base)

Entuity supports SNMP MIBs only. MIBs are present within nodes on a network, and comprise a logical collection of managed objects arranged in a tree structure. Managing agents on an element use MIBs to store information regarding the element, e.g. the speed at which packets of information are transferred.

All managed objects within a MIB share a common root.

Mobility Controller

An SNMP manageable hardware device, manufactured by Aruba, that controls and coordinates the operation of a group of Aruba Wireless Access Points. In an Aruba wireless

network deployment all wireless equipment discovery and real-time monitoring is performed via the Mobility Controllers rather than via SNMP/ping monitoring of the individual Access Points.

Multicast

Network communication between a single sender and multiple receivers.

My Network

Supplied view that contains the entire set of managed object's the user is permitted to view. Different users may have different devices in their My Network view, reflecting their different access permissions.

Node

An SNMP managed device attached to a network, from which data can be retrieved. For example, node devices such as hubs, routers, bridges, or network printers.

OID

An Object Identifier is a sequence of integers that represent the position of an object in the hierarchical structure of objects in a MIB.

OMF (Open Modeling Framework)

Flexible Entuity framework that allows the fast integration and management of new types of managed objects, e.g. new device types. For example, the BladeCenter device type is implemented through the OMF.

OSI Model

A model for networks developed by International Standards Organization (ISO). The network is divided into seven layers, each layer building on the services provided below it.

Packet

Any logical block of data sent over a network; it contains a header consisting of control information such as sender, receiver, and error-control data, as well as the message itself. May be fixed or variable length.

PCR (Peak Cell Rate)

PCR is the maximum short term data throughput supported by an ATM port; the limit to which traffic can burst.

Percentile Utilization

Percentile Utilization indicates that for a defined percent of the time, e.g. 95, port utilization is below this value. It is useful for monitoring the sustained utilization of the port.

The 95th percentile is derived by ordering the utilization data by value, from highest to lowest. Application of a least square fit method removes spikes that would distort the analysis. The top 5% values are discarded, leaving the 95th percentile. This value is calculated for both inbound and outbound utilization.

Policy Group

Entuity licensing is enabled by grouping related types of managed objects into groups. These Policy Groups are then assigned a license credit quota. Before Entuity manages an object it first checks whether the license allows its management and then whether a credit is required. When a license credit is required, Entuity checks that the policy group to which the object's type is associated has available credits. For example, before Entuity manages a device it checks the device licensing policy group for available credits.

Polling

Devices on the network are accessed by the system at regular, pre-defined, intervals in order to retrieve required data. This is referred to as polling the devices.

Polling Engine

The Polling Engine (or Core Management Engine) is the set of processes within an Entuity server responsible for all general network management tasks excluding flow collection (e.g. network discovery, inventory, monitoring, event management).

Administrators can enable/disable an Entuity server's Polling Engine through `configure`, a decision which should be made according to the role the administrator wants the server to perform in the management of the network.

Port

Entuity considers ports as interfaces on network devices, e.g. routers, and as endpoints in communications systems. In IP an upper-layer process that receives information from lower layers. Ports are numbered, and each numbered port is associated with a specific process. For example, SMTP is associated with port 25.

TCP and UDP transport layer protocols used on Ethernet use port numbers to distinguish between (demultiplex) different logical channels on the same network interface on the same computer.

Protocol

A set of formal rules detailing how to transmit data across a network. Example protocols include TCP, UDP and IP.

PVC (Permanent Virtual Circuit)

PVC is a Frame Relay virtual connection providing the user with the equivalent of a physical connection to a destination address, using shared facilities. Virtual circuits can be permanent (PVC) or switched (SVC).

Reachability

Availability Monitor sends an ICMP ping to the management IP address of managed devices, by default every two minutes. Devices that respond are considered reachable, those that do not respond, after the set number of retries, are considered unreachable. When Availability Monitor (`applicationMonitor`) is not running, then the reachability of the device is Unknown for that period, although Entuity maintains the last known state of the device.

Reboot

Entuity uses the device sysuptime to calculate when the device was last rebooted, or more accurately when the device last came up after being rebooted.

Reconciliation Rules

Within BMC Atrium reconciliation rules are applied by the reconciliation engine to improve accuracy and efficiency of maintaining IT environment data in the CMDB. Reconciliation is used to identify and merge CI information and relationship form imported dataset with production dataset.

Remedy Help Desk / Service Desk

Entuity Remedy AR System Integration for Remedy AR System 7.0 includes a sample configuration which integrates with the Remedy Service Desk application.

Remote Server

A remote server is an Entuity server configured to trust another central Entuity server. A user logged into the central Entuity server is able to view information collected by the remote Entuity server(s), according to their user account access rights. A remote Entuity server responds to requests from a trusted central Entuity server, and freely shares information with it.

An Entuity server can be configured to perform both roles, be both a remote and central Entuity Server, allowing administrators to create both hub-n-spoke and fully meshed deployments.

Configuration of central and remote servers is through the Multi-Server Administration area of the Entuity web UI.

Router

A device that routes data between networks. Routers connect multiple LAN segments to each other or to a WAN.

Routers may be equipped to provide frame relay support to the LAN devices they serve. These routers can:

- encapsulate LAN frames in frame relay frames and send those frames to a frame relay switch for transmission across the WAN.
- receive frame relay frames from the WAN, strip the frame relay frame off each frame producing the original LAN frame, and forward it to the end device.

Running-config

The configuration controlling the current operation of a piece of Cisco hardware. This may be different to the start-up config if changes have been made since start-up and the changes have not been saved. The running-config can be saved as the startup-config replacing any previous start-up config. The running config is held in DRAM. If the machine is restarted without the running-config being saved, all changes are lost.

Sample Interval

In Entuity the period between two data samples. This may be between two pollings of a port, or between two rolled up data samples.

SCR (Sustainable Cell Rate)

SCR is the long term data throughput of an ATM port. Traffic can burst above this limit up to the PCR.

Server

Any computer whose function in a network is to provide user access to files, printing, communications, and other services. Servers usually have more memory, more disk storage, and a more advanced processor than a single-user desktop PC.

Where Entuity manages an application, Entuity can manage the application server as a device.

Services

Services is a method of grouping together collections of ports that provide a service and associating with them other ports which use that service. For example, a service maybe e-mail, with one port designated as the provider of the service and all others in the group defined as consumers.

SLA

A Service Level Agreement (SLA) is a set of rules and metrics which can be used to measure the efficiency and performance of an object. That object may be a department, a server, a network or any other functional component of an organization. If an object adheres to its associated set of rules and metrics, then it can be said to be conforming to its SLA. Similarly, if the object breaches the set of rules and metrics, then this means that it is no longer conforming to its SLA.

SNMP

Standardized method of managing and monitoring network devices on TCP/IP based internets. SNMP defines the formats of a set of network management messages, and the rules by which those messages are exchanged. The network management messages are used to make requests for performing network management functions and to report on events that occur in the network. Also, SNMP defines the allowable data types for MIBs, they way in which MIBs can be structured, and a set of standard objects that can be used in implementing a MIB.

Spanning Tree

Spanning tree provides a vendor neutral technology for visibility into your network. When correctly implemented Entuity discovers bridge links, switch to switch relationships, through polling the Bridge MIB. Complete spanning tree connectivity relies on a contiguous set of Entuity managed devices.

Spare Ports

By default Entuity spare port calculations include ports that have been unused for forty days or more, include ports that have system uptime of less than forty days and are currently unused and exclude ports that have been unused for less than forty days but have a system uptime of forty days or more.

By default Entuity spare port calculations:

- Include ports that have been unused for forty days or more.
- Include ports that have system uptime of less than forty days and are currently unused.
- Exclude ports that have been unused for less than forty days but have a system uptime of forty days or more.

The forty day threshold is configurable through the reporting section of entuity.cfg. Entuity distinguishes between physical and virtual ports using interface type. If required System Administrators can amend the virtual port identifier.

SNMP Agent

Management code that resides in the device, controls the operation of the device, and responds to SNMP requests.

SSL

An SSL Certificate consists of a public key and a private key. The public key is used to encrypt information and the private key is used to decipher it. When a browser points to a secured domain, an SSL handshake authenticates the server and the client and establishes an encryption method and a unique session key. They can begin a secure session that guarantees message privacy and message integrity.

Startup-config

The initial configuration when a piece of Cisco hardware starts-up. If there have been no changes to the configuration since start-up, this will be the same as the running-config. The startup-config is also referred to as the saved config. The startup-config is held in NVRAM.

Static Thresholds

Static threshold settings allow you to configure the trigger points which when crossed cause Entuity to raise events. You can set thresholds against an individual event, a managed object, view or all objects on an Entuity server.

StormWorks

StormWorks is the internal Entuity engine, also known as the Data Management Kernel (DMK). It runs as the ***DsKernelStatic*** process.StormWorks enables the delivery of functionality through a highly configurable set of core services. The configuration files, found in *entuity_home*\etc, prefixed with ***sw_*** define and configure StormWorks services.

Entuity assigns all of the objects it manages their own StormWorks identifier. StormWorks identifiers are sequentially assigned, do not consider the object type and are unique within each Entuity server. *StormWorks ID* is visible from the object's web UI Advanced tab, and is used in creating dashboards to the user, for example during Data Export, Map Export, running of Flex Reports.

Stream Attributes

Information Entuity collects from your network is stored within Entuity as an attribute of the managed object, for example a port's name, a port's utilization are stored as attributes. Stream attributes are to maintain a history of a metric, for example Entuity maintains a history of port utilization.

SVG

Scalable Vector Graphics (SVG) is a graphics file format and Web development language based on XML. SVG is used by Entuity's reports to dynamically generate, high-quality graphics from real-time data.

Switch

A switch is a network device that selects a path or circuit for sending a unit of data to its next destination. It is usually simpler and faster than a router, which requires knowledge about the network to determine the route.

A switch may also include the function of the router, a device or program that can determine the route and specifically what adjacent network point the data should be sent to.

SynOptics Network Management Protocol (SONMP)

SONMP is also known as the Nortel Discovery Protocol (NDP), a Data Link Layer network protocol for discovery of Nortel (Avaya and Ciena) devices. It is available as a technology link type for the Entuity maps.

System Capabilities

Entuity determines the switching capability of a device by checking the group dot1dtp, specifically the mandatory scalar value dot1dTpLearnedEntryDiscards. dot1dtp is only present when the device supports transparent bridging, which implies it has Ethernet switching capability.

Entuity determines the routing capability of a device by checking for the ip-forwarding variable from the ip group in the MIB of the device. When ip-forwarding has a value of 1, this implies the device is acting as a gateway and so has routing capability.

Entuity determines whether the device type is hub by comparing its type to device types detailed in the vendor files.

TCP

Connection-oriented protocol that provides a reliable byte stream over IP. A reliable connection means that each end of the session is guaranteed to receive all of the data transmitted by the other end of the connection, in the same order that it was originally transmitted without receiving duplicates.

TCP/IP

Combination of TCP and IP protocols common to many different computer systems and so often used for communication between them.

TFTP

Trivial File Transfer Protocol (TFTP) is a very simple file transfer protocol, with the functionality of a very basic form of FTP. It uses UDP as its transport protocol and has no authentication or encryption mechanisms.

Ticker

Ticker allows you to view real time output at the device and port level, viewing data changes as they occur. You can select to view data activity for one or more client devices or ports.

For monitored:

- Ports you can select from a list of MIB variables the particular variable(s) you want to use to monitor the port. Entuity is supplied with a default number of MIB variables for use with ports and you can also add your own MIB variables to this list.
- Devices you can create your own list of MIB variables on which to monitor the device.

traceroute

Entuity includes two types of traceroute functionality, identified in the Entuity client as TraceRoute from Client and TraceRoute from Server.

TraceRoute from Entuity Client, calls the traceroute utility installed on the Entuity client machine and performs a live traceroute from the Entuity client to the target IP address.

TraceRoute from Entuity Server, uses data collected by `applicationMonitor`. This traceroute information is updated every two minutes, so calling TraceRoute from Server does not initiate a live traceroute but instead interrogates the data returned from the last `applicationMonitor` traceroute.

`applicationMonitor` uses Entuity's own implementation of traceroute functionality. This implementation performs ICMP pings in a similar way to a standard traceroute but with this key difference. When performing a traceroute `applicationMonitor` increments TTL values by one, until the pings reach the edge of an invisible cloud. At this point `applicationMonitor` increase the TTL value to 32. When this results in the ping reaching its target, the response from the target includes the actual number of hops required to reach target.

Traps

Traps can be used by network components to signal abnormal conditions. Entuity can both receive and forward SNMP traps.

Entuity can be configured to:

- Generate events in Event Viewer then traps are received.
- Forward traps to up to six concurrent recipients.

Entuity also supply a more advanced SNMP trap forwarding integration module. Contact your Entuity sales representative for details.

Trivial Change

A difference between a current-configuration file and a previously archived one that is not considered important by the system because it matches a set of rules codified as patterns in an "ignore file". Trivial changes may include comments such as timestamps in a configuration file.

Root Cause Analysis (RCA)

RCA isolates IT related problems using vector differencing. This involves the building of a dependency chain of objects and monitoring the object states in that chain. In the event of state changes (where each object state change is a vector), differencing the dependency chain state vectors enables Entuity to determine the true cause of the event. Entuity can then raise the appropriate event.

For example, if an application becomes unavailable because a switch has failed then Entuity raises an event relating to the switch failure in Event Viewer. Entuity does not raise events for

the application being unavailable as changes in state in the dependency chain are attributed to the switch failure.

Trunk Ports

Trunk ports, i.e. ports connecting switches together.

Entuity identifies a trunk port by:

- reading the MIB.
- ***macman*** identifying the switch port as having more than ten MAC addresses and also having associated VLANs.
- using CDP Trunk Port Discovery, a CISCO proprietary method.

When one or more of these methods identifies a trunk port, Entuity also considers it as a trunk port.

Unclassified Devices

Entuity managed devices for which Entuity does not have a device support dataset, provided through individual vendor, bin.vendor or newbin.vendor files, are included to Entuity as Unclassified devices under Full Management, or Unclassified devices under Ping-only and Basic Management.

Unclassified generically managed devices use an Uncertified device type, created by Entuity and held in newbin.vendor. These are Entuity managed devices and do incur a license charge. System Administrators should contact their Entuity support representative for a vendor file which would ensure Entuity fully manages these devices.

Unicast

Unicast is network communication between a single sender and a single receiver.

Uplink Detection

Entuity considers an uplink as trunking on a connection to a router or layer 3 switch, which is visible through spanning tree. This technology attempts to link layer 3 with layer 2.

Where links between switches and routers are not done using VLAN trunking and spanning tree then the spanning tree technology will not detect them. This is typically at smaller satellite offices, which do not need the greater port density and much greater speed available from router on a stick and even greater speed available from layer 3 switching.

Uplinks

Ports connecting routers with switches.

Uptime

By default Entuity polls devices every five minutes, retrieving device *sysuptime*. Entuity checks as to whether the device has been continually up since the last poll, and modifies the device's uptime value accordingly.

When *sysuptime* indicates the device has been down during the polling interval but is now up, from *sysuptime* alone Entuity cannot identify for how long the device was down. Entuity takes this unknown time, and adds fifty percent of it to the known uptime value, with the remaining fifty percent considered UNKNOWN. For example where *sysuptime* has a value of two minutes. Entuity cannot determine the state of the device over the first three minutes of the polling interval. Entuity adds ninety seconds to the *sysuptime* value, giving an uptime value of two hundred and ten seconds and records the device state as UNKNOWN for ninety seconds.

Device uptime is visible through Component Viewer, and is used in many reports, e.g. Routing Summary, Switching Summary.

Utilization

In Entuity port utilization is expressed as a percentage of actual traffic volume against the maximum volume that can be handled by the port.

UUID (Universally Unique ID)

A 16 byte value written to a system's planar at manufacturing time to uniquely identify a system across time and space.

Variable Binding

A variable binding, or VarBind, refers to the pairing of the name of a MIB variable to the variable's value. A VarBindList is a simple list of variable names and corresponding values. Some PDUs are concerned only with the name of a variable and not its value (e.g., the GetRequest-PDU). In this case, the value portion of the binding is ignored by the protocol entity. However, the value portion must still have valid ASN.1 syntax and encoding. It is recommended that the ASN.1 value NULL be used for the value portion of such bindings.

VCC (Virtual Channel Connection)

A VCC is an association established at the ATM Layer between two or more endpoints for the purpose of user-user, user-network, or network-network information transfer. The points at which the ATM cell payload is passed to the AAL for processing signify the endpoints of a VCC. Virtual Circuit is a more generic, non-ATM specific term.

VCI (Virtual Channel Identifier)

VPI and VCI together identify a virtual channel link on an ATM interface.

Vendor Files

Entuity identifies the device type of discovered devices by matching their sysoid to that held against the device support datasets. Device support dataset definitions are held in, listed here in order of precedence, individual vendor files, bin.vendor file, newbin.vendor file, and then uncertified file.

vendinfo identifies the vendor information available to Entuity and the decisions made when more than one vendor file is available for a particular sysoid; which vendor device definition Entuity uses to manage that device type.

File Type	Description
individual vendor files	When Entuity does not currently manage a device that you require it to, you can request your Entuity support representative for an appropriate vendor file. Those non-standard definitions are listed in entuity_home/etc/exotica. Only when a vendor file is moved to entuity_home/etc does Entuity use that definition.
bin.vendor file	File includes the default vendor file definition
newbin.vendor file	File includes device type definitions generated by earlier versions of Entuity.
uncertified file	File includes device type definitions created by Entuity, using proliferate with the -g parameter. Devices of this type are considered as Unclassified Devices.

View

All network objects within Entuity are displayed through views. View filters allow you to restrict the displayed objects in the view to the ones you are interested in. You can also use user profiles to control access to different views.

Virtual Channel Links (VCLs)

A VCC consists of the concatenated VCLs. A VCL is a means of unidirectional transport of ATM cells between the points where a VCI value is assigned and the point where the value is translated or removed. The VPI and VCI within the ATM cell header associates each cell with a particular VCL over a given physical link.

Virtual Circuit

A Virtual Circuit is a generic term for an association established between two or more endpoints for the purpose of user-user, user-network, or network-network information transfer. An example would be ATM's VCC.

Virtual Port

Entuity distinguishes between physical and virtual ports using interface type. If required System Administrators can amend the virtual port identifier.

VLAN

A logical association that allows users to communicate as if they were physically connected to a single LAN, independent of the actual physical configuration of the network.

VM Platforms

Entuity currently manages Oracle and VMware VMs through its VM Platform device type. Entuity communicates with VMs and their hypervisors through the VM's SDK. This requires specification of different connection attributes when compared to devices of other types. It also requires that all VMs are added to Entuity with a **Ping Only** management level, as this allows the selection of the VM Platform type and its connection configuration. When adding VMs using autoDiscovery care must be taken to ensure candidate device VMs are always added as **Ping Only**.

VPD (Vital Product Data)

VPD is information about a device that is stored on a computer's hard disk (or the device itself) that allows the device to be administered at a system or network level. Typical VPD information includes a product model number, a unique serial number, product release level, maintenance level, and other information specific to the device type. Vital product data can also include user-defined information, such as the building and department location of the device. The collection and use of vital product data allows the status of a network or computer system to be understood and service provided more quickly.

VPI (Virtual Path Identifier)

VPI identifies a virtual path leg on an ATM interface.

VRF (Virtual Routing and Forwarding)

VRF allows multiple instances of a routing table to co-exist within the same router at the same time. Because the routing instances are independent, the same or overlapping IP addresses can be used without conflicting with each other.

VTP (VLAN Trunk Protocol) Domain

A VTP domain consists of one or more connected switches that share the same VTP domain name. A switch can be configured to be in one and only one VTP domain. The vtpDomainTool generates a view that groups devices and VLANS by this VTP domain name.

Wireless Controller (WC)

A network attached device that coordinates traffic to and from Lightweight Wireless Access Points (LAPs). It provides centralized control over the configuration and dynamic behavior of potentially many LAPs.

Index

Numerics

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

V

W