USER GUIDE



# Entuity<sup>®</sup> 16.5

Entuity Integration Module for BMC® Remedy Action Request System 1.1

Entuity Integration Module for BMC Remedy Action Request System maximizes the accuracy and minimizes the effort necessary to create service processes in the BMC Remedy AR System. Entuity's extensive IT infrastructure details are also linked to opened action requests to improve overall service resolution.

#### North America Headquarters

4 Mount Royal Avenue Suite 340 Marlborough, MA 01752 Tel: +1 508 357 6344 Fax: +1 508 357 6358

#### EMEA Headquarters

9a Devonshire Square London, EC2M 4YN Tel: +44 (0)20 7444 4800 Fax: +44 (0)20 7444 4808

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## 1 Entuity Integration for BMC Remedy AR System

The Entuity Integration for BMC Remedy AR System automates the workflow of generating Action Requests (ARs) from within Entuity's management system. An AR can be generated after a fault or troublesome event by any IT infrastructure assets under management by Entuity. Additionally, an administrator can raise a non-specific AR, or identify a network object (or set of objects) and generate an AR for specific action against those devices. This allows IT staff to identify, coordinate, schedule, address, and track resources required to maintain the network, and feeds to MTTR and MTBF analysis.

Action Requests generated from Entuity are used in the AR System for normal action request processing and assignment. To provide supporting information to an action request, the Entuity management console can be directly invoked from within an AR, allowing network administrators to access all of the real-time and historical event information stored in Entuity.

More specifically, the Entuity AR System Integration enables:

- automatic generation of ARs, derived from Entuity events, to particular application forms on target AR System servers.
- interactive generation of 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.
- AR System-invoked Entuity Lookup: context-sensitive invocation of Entuity from an AR System form. Entuity passes to the AR System a URL identifying the managed object that is the source of the AR.



Figure 1 Entuity Integration for BMC Remedy AR System Overview

The default integration allows you to install the sample integration implementation to work with Remedy AR System 7.0, using the AR System Service Desk application.

For the default integration Entuity forwards information on two types of managed objects, devices and ports. Entuity can also pass to AR System a URL identifying the managed object that is the source of the AR. From an AR System you can open Entuity with the focus on the managed object.

Contact Entuity support for how Entuity Integration for BMC Remedy AR System can work with:

- Multiple Remedy AR system servers, including working with different Remedy versions.
- Forms in applications other than the AR System Help Desk/System Service Desk application.

### **BMC Remedy AR System Management**

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.

AR System users access applications according to permissions that are set against users and groups. Information forwarded by Entuity conforms to this permissioning model.

The Entuity Integration for BMC Remedy AR System integration allows Entuity to map its data through configuration files to the required AR System formats, forms and applications.

### Entuity Integration for BMC Remedy AR System

Entuity Integration for BMC Remedy AR System requires a valid license and inclusion of configuration files to Entuity. The default installation allows interactive AR generation, automatic AR generation requires additional configuration.

#### **Module Availability**

The Entuity Integration for BMC Remedy AR System is available with Entuity. (For details on Entuity's technical specification see the *Entuity Getting Started Guide*.)

Entuity Integration for BMC Remedy AR System is approved for use with:

- Remedy AR System 8.1.
- Remedy AR System 7.0 including Remedy Mid Tier 7.0.

#### **Module Security**

Entuity access permissions are granted based on that view membership according to the standard Entuity security model. To access the Advanced Action menus from the Entuity client the user account requires the Remedy tool permission. With automatic AR generation

the user account defined in <code>remedyforkevent.cfg</code> must have access to the Entuity view used with automatic AR generation.

Entuity Integration for BMC Remedy AR System requires Remedy user accounts to access the AR System server and midtier, and also to raise and view ARs. Remedy user account details are held in the arhelpdsk\_server.cfg, arhelpdsk70.cfg and arhelpdsk70\_global.cfg files.

#### **Required Linux Red Hat 6 Packages**

When running this integration on Linux Red Hat 6 Entuity there are four required packages, see *Table 1 Additional Packages Required with Entuity BMC Integrations*.

Linux Red Hat 6 Packages Required with BMC Integrations										
compat-libstdc++-33.i686	glibc.i686	nss-softokn-freebl.i686	libgcc.i686							

Table 1 Additional Packages Required with Entuity BMC Integrations

To check if a package is installed, from the server command line you can use the RPM Package Manager (RPM). For example to check if the package glibc.i686 is installed, from the server command line enter:

rpm -q glibc.i686

When the package is:

Not installed RPM returns:

glibc.i686 is not installed

Installed RPM returns details, for example:

```
glibc-2.12-1.80.el6_3.6.i686
```

You can also check all of the packages through one instruction:

```
for i in libgcc.i686 glibc.i686 nss-softokn-freebl.i686
compat-libstdc++-33.i686; do rpm -q $i ;done
```



You should consult the Red Hat documentation before installing the missing required packages.

You must install any missing packages to the server before using the integration. Your system should be registered with Red Hat Network Classic and be set to receive software updates.

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

```
yum install libgcc.i686 glibc.i686 nss-softokn-freebl.i686
compat-libstdc++-33.i686
```

### Linux 64-bit arforward

arforward converts the Entuity data to the format required by the target AR System form and forwards it to the appropriate AR System server. In Linux installs arforward.exe is a 64-bit executable and arforward\_32.exe is the 32-bit version. If you want to use the 32-bit version then you must rename it to arforward.exe. arforward is included to entuity\_home/integ/Remedy/.

### Interactive AR Generation Overview

You can manually generate ARs from within Entuity using the Advanced Actions available from the menu bar and context menus. These menus are available from Event Viewer and the Find Tool.

Interactive generation of ARs is implemented using AR System API calls from within the Entuity server to populate an AR System form. This allows the Entuity user to open ARs related to a one-off event or specific object in the context of whatever item is highlighted when the menu item is invoked.

The display of an AR System form during interactive generation of ARs relies on connecting to an AR System server through the Remedy Mid Tier.

Overview of the interactive AR generation process:

- From Entuity's client AR System menus are available, either from a context menu which only displays menu options for the active object, or from the Menu bar which allows the raising of a global incident independent of an Entuity context.
- 2) arforward converts the Entuity data to the format required by the target AR System form and forwards it to the appropriate AR System server.



Figure 2 Interactive AR Generation Architecture

### Automatic AR Generation Overview

By editing Entuity Integration for BMC Remedy AR System configuration files, you can configure Entuity to automatically generate ARs on an AR System server when Entuity raises events in a specified view.

Entuity recommend that you create a view for use by the AR integration. For the AR view set appropriate event and object filters, as by default every event raised in this view triggers the automatic generation of an AR ticket.

When Entuity raises an event in the AR view:

- Event management process forwards the event to forkevent (when forkevent starts it registers itself as a client of the process, using the details in the connect section of its configuration file).
- 2) forkevent structures the information and by default passes event information to EventActionApplication.

EventActionApplication uses any menu definitions that specify the RemedyForkEvent application to decide what additional information should be extracted from Entuity's database.

- 3) EventActionApplication combines the event data sent by forkevent and the Entuity data retrieved as specified in the menu definition and invokes the arforward action, that was specified in the menu definition with the combined information as command line input.
- arforward converts the Entuity information received in its command line input to the format required by the target AR System form and forwards it to the appropriate AR System server.

You can set an additional event filter, through sw\_remedy\_menu\_def.cfg, to allow only certain events in a view to automatically trigger AR generation.



Figure 3 Automatic AR Generation Architecture

## 2 Configuring the Integration

Entuity Integration for BMC Remedy AR System is supplied with a sample application. The degree to which the sample application meets your requirements determines how involved is the configuration process.

## **Entuity Integration Configuration Files**

Configuration of the Entuity Integration for BMC Remedy AR System integration is through application of configuration files and the subsequent running of configure. You can also edit the configuration files to customize the sample integration.

Filename	Description
arhelpdsk.cfg	arforward Configuration, maps the extracted Entuity data to the target AR forms. It is used when AR generation is called within a context, e.g. an event or object is selected in the Entuity client.
arhelpdsk_global.cfg	arforward Configuration, maps the extracted Entuity data to the target AR forms. It is used when AR generation is called without a context, e.g. an event or object is not selected in the Entuity client., the Advanced Action being called from the menu bar.
arhelpdsk_server.cfg	AR System server connection, details parameters required to connect to the AR System server.
remedyforkevent.cfg	Event Action Configuration, specifies automatic AR generation through the forkevent process and EventActionApplication.
RemedyForkEvent.log	Default name of the Remedy forkevent log file.
RemedyForkEventLoggerCo nf.xml	Sets the parameters for the Remedy forkevent log file, including name, maximum number of backups, maximum file size, warning level.
startup_ <b>O/S.</b> cfg	A standard Entuity file that defines Entuity processes that should run when the Entuity server is running, This file includes a sample Remedy section.
<pre>startup_ <math>O/S_site_specific.cfg</math></pre>	The site specific startup file for Entuity. For automatic AR generation copy the Remedy section from startup_O/S.cfg and set the state to normal.
sw_remedy_menu_def.cfg	Advanced Actions Configuration, details advanced actions for interactive AR generation and the type of information gathered for both interactive and automatic AR generation. This is applied to the Entuity server.

Table 2 Entuity Integration for BMC Remedy AR System Integration Files



When you edit the configuration files you may want to consider backing them up, or renaming them, to preserve the changes during any subsequent Entuity re-install or upgrade (see *Appendix B - Entuity AR System Installation Files*).

## **Integration Overview**

Activation of Entuity Integration for BMC Remedy AR System requires an appropriate license, inclusion of its configuration and the running of Entuity configure.



Figure 4 Integration Configuration Process Overview

The Entuity AR System is supplied with a default implementation. Before activating Entuity AR System you should:

- Ensure you have set up Remedy AR System accounts for use with the integration.
- Add to the Entuity server a license that includes Entuity AR System. By default license.dat is installed to entuity\_home\etc.
- Consider renaming, or backing up, configuration files when you have amended the default settings (see Appendix B Entuity AR System Installation Files).
- Decide whether you want to run automatic AR generation. You should understand which managed object - event type combinations you want to allow automatic AR generation. You can filter managed object and events through Entuity view filters.

## Setting Up Entuity AR System Accounts

Entuity requires access to the AR System. You should set up account(s) that allow access to the AR System server with both submitter and viewer permissions to the integration's AR forms.





In Remedy AR System 7.0 an account must be a valid entry in the Peoples form, created through the Application Administration tool, with Assignment Availability and be a member of Support Staff. You can:

- Accept the default account used by Entuity, creating it in on your AR System server.
- Use different AR System server account(s), which then require you to amend the user account details used by Entuity Integration for BMC Remedy AR System.

Name	Default	Description
user	EYEUser	Entered through configure, which writes it to arhelpdsk_server.cfg.
password	eyeuser	Entered through configure, which writes it to arhelpdsk_server.cfg.
ARFirstName	EYE	Entered through arhelpdedsk70.cfg and arhelpdsk70_global.cfg.

Table 3 User Account Information for Remedy AR System 7.0

Name	Default	Description
ARLastName	User	Entered through arhelpdedsk70.cfg and arhelpdsk70_global.cfg.

Table 3 User Account Information for Remedy AR System 7.0

## **Configuring Interactive Remedy AR System**

Entuity recommend configuring Entuity Integration for BMC Remedy AR System through configure, this allows interactive AR generation from Entuity. When you want to activate automatic AR generation you will have to manually edit the files.



Figure 6 Configuring Interactive AR Generation

To activate Entuity Integration for BMC Remedy AR System:

- Acquire a valid license from your Entuity representative. The new license file should be added to *entuity\_home*/etc.
- 2) Stop the Entuity server.
- 3) Run Entuity configure, and when it is run:
  - As a wizard, from the Module Select page check the appropriate version of Entuity Integration for BMC Remedy AR System integration.
  - From the command line, when prompted enter **yes** to modify the activated modules

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and again when prompted to activate the Entuity Integration for BMC Remedy AR System integration.

- 4) configure prompts for you to enter:
  - Server, IP address or resolved name of the Remedy AR server.
  - MidTier, IP address or resolved name of the Remedy AR MidTier.
  - User, user name required to access Remedy AR System.
  - Password, valid user account password (optional).
  - Auth, authorization level (optional).
  - Port, port used to communicate with Remedy AR System (optional).
  - *Rpc*, set to RPC program number when using a non-administrator server for RPC and 0 when not.

Ssl, set to	1 when	using	SSL	and	0	when	not.

e	Entuity Server	Configuration – 🗆	×									
	INTEGRATION FOR BMC REME	DY ACTION REQUEST SYSTEM										
2 entuity												
Integration for BN	1C Remedy Action Request Syste	em										
Server IP Addres	s:	10.44.7.35										
MidTier IP Addres	35:	10.44.7.35										
User:		Demo										
Pass (optional):												
Auth (optional):												
Port (optional):												
RPC (optional):												
SSL:												
Help	Cancel	Back Next										

Figure 7 Configure Entuity Remedy AR System

- 5) Complete configure.
- 6) When using non-default user accounts, enter the account information by amending the *ARFirstName* and *ARLastName* section in arhelpdedsk.cfg and arhelpdsk\_global.cfg.
- 7) Restart the Entuity server.

Entuity's discovery process may take a number of hours to discover all of the Remedy advanced actions required for the Entuity Integration for BMC Remedy AR System integration.

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## **Configuring Automatic AR Generation**

Entuity Integration for BMC Remedy AR System includes the facility for automatic forwarding of events to the AR System and raising of ARs.



Figure 8 Configuring Automatic AR Generation

After configuring interactive AR generation you can then configure automatic AR generation:

 Open an Entuity client and create the view (e.g. coreRouters) for use with the integration. Take care to include to the view only those object - event type combinations against which you would want automatic AR generation.

By default, all events that are raised in this view cause automatic AR generation.

2) Amend *entuity\_home*/etc/remedyforkevent.cfg to permit access to that view on your Entuity server, for example:

```
[connection]
username=JJones
view=coreRouters
```

This example forwards all events in the coreRouters view, with access being permitted to forkevent through the defined Entuity user account.



By default Entuity Integration for BMC Remedy AR System forwards all events in the defined view. You can apply an additional filter, through sw\_remedy\_menu\_def.cfg, which would only forward explicitly detailed events.

3) Amend the startup state of Remedy to normal, to allow forkevent to run automatically each time Entuity starts. In the Entuity startup file (startup\_0/ S\_site\_specific.cfg) amend the Remedy configuration to:

```
[remedy]
state=normal
type=command
start=${ENTUITY_HOME}${FPS}integ${FPS}ForkEvent${FPS}forkevent
${ENTUITY_HOME}${FPS}etc${FPS}remedyforkevent.cfg pipe_remedy
directory=${LOGDIR}
is_critical=n
```



Entuity Integration for BMC Remedy AR System logging information is listed in EventActionApplication.log file. For more detail set the log level to true in *entuity\_home*/etc/RemedyForkEventLoggerConf.xml. This is valid only for the automatic integration.

4) Stop and restart Entuity.

## **3** Controlling Access to Advanced Actions

Entuity Integration for BMC Remedy AR System uses Advanced Actions to present the user menus through which you can generate ARs.

### **Accessing Integration Menus**

When Entuity Integration for BMC Remedy AR System integration is enabled on the Entuity server access to the integration menus is still restricted; by default only members of the Administrators user group have access. Access for other users to these menus is granted through the User Group Tools and Permissions dialog.

To extend access to the integration menus ensure that you are logged into Entuity as a member of the Administrators Group, and then:

- 1) Click Administration > Account Management.
- 2) Highlight the group whose tool permissions you want to amend.
- 3) Select **Tools Permissions**. Entuity displays the Modify Tools Permission dialog.

I Permissions for All Users	
Tools	
Flow Inspection	Application Monitor
Ticker	Annotation Manager
Configuration Management Administration	Trace Route
Configuration Monitor	Remote Terminal
MIB Browser	
Reports	
Flex Reports	Reports and InSight Center
Report Builder (Requires Reports and InSight Center)	
Administrator Tools	
User Defined Polling	Object Editing
View Audit Log	Multi-Server Administration
Entuity Health	Data Export
Event Administration	Event Notification Administration
IPSLA Administration	Event Suppression
Menus and Links	
Show Remedy	Show User Menus
Inventory	

Figure 9 Modifying Tool Permissions

- 4) In Menus and Links check Show Remedy.
- 5) Press **OK** to save the tool permissions and exit from the dialog.

## **4 Interactive Action Request Generation**

From Entuity you can manually generate an AR. The default content of the AR depends upon from where the AR context menu was called from. Entuity defaults values from the current highlighted object or objects, together with values relating to the Entuity server, AR user and AR form. Specifically, the AR System menu takes as its context in:

- Event Viewer the highlighted event(s) or incident(s).
- Explorer the highlighted object or objects.
- Map the highlighted object or objects.
- Search Tool the highlighted result object, or objects.

Entuity does not verify whether an AR has already been raised against an event or incident. When unsure you should first check the AR System, or configure Remedy to handle AR deduplication.



Figure 10 Raising Multiple Incidents from a Map

## Generating ARs from Event Viewer

The automatic AR generation on the raising of an event can be supplemented with the interactive generation of ARs from Event Viewer, appropriate for when a view does not support automatic AR generation.



Entuity Support recommend forwarding incidents raised by Entuity. You could forward events but you are forfeiting the benefits of the Entuity incident handling mechanism. What you should avoid is forwarding a combination of events and incidents to the same Remedy server.

To raise ARs for event(s) or incident(s), from Event Viewer:

1) Highlight the event(s) or incident(s), and open the context menu.

8 er	ntuity											User: ac <u>Page U</u> r	dmin@entlon odated:00:05	opvm01 [Le :46, GMT	oqout]
Dashboards	InSight Center	Explorer	Events	Maps	Ch	arts Flows	Report	s Tools	Administra	tion	Help	10.66			P
Browse	Hand Drop Box	-	- Sho	wing: Inc	ident	s Filter: All (	open) Sc	ope: Key De	vices					Co	unt: 8
Consolidate ser	/ers: off		1	State	Α	Name		Source		Deta	ils		▼ Last Upd	lated	#
E Key	Devices		• 🔶	open		Network Out	age	c3560 [ VI7	33 ] Vlan733	Port	Unreach	able: c356	22-Nov-201	5, 14:09:14	1
<b>•</b>	10.44.1.43		•	open		Network Out	age	Configuration	n Manageme	nt 🕨	Unreach	able: new2	22-Nov-201	5, 14:09:13	1
	hottom2960		•	open		Entuity Serve	er Comp	BMC Remedy	AR System	Þ	Rai	se Multiple	Incidents	<b>5, 14:34:3</b> 3	16
			•	open		Network Out	age	Show Live St	atus	_	Rai	se Sinale In	Aflent	5, 14:34:03	17
± 🗸	bottom3550		•	open		Network Out	age	Threshold Se	attings		omeach	able. news	10 100 201	5, 14:34:03	17
÷ 🗸	c3560		•	open		AvailMonitor	Applica	Annekaka	.cong.s				05-Nov-201	5, 15:48:27	1
+0	entlonsw03		10	open		AvailMonitor	Applica	Annotate					05-Nov-201	5, 15:48:27	1
+0	new2610		•	open		Entuity Serve	er Shute	Assign User.			al Proce	ss [schedul	31-Jul-2015	, 09:44:18	1
	ton3550							Close							
🛨 📒 Lon	don														
🕂 📒 Mac	Irid														
🕂 📒 Net	work Support														
🛨 📒 Nev	/ York														
entlonppvm01	/webUI/viewEvent	ts.do?menuľ	Name=	Events#											

Figure 11 ARs Raised from Event Viewer

- 2) Select BMC AR Remedy System and then the appropriate command:
  - Raise Multiple Incidents, to raise one AR for each highlighted incident or event.
  - Raise Single Incident, to raise one AR for all of the highlighted incidents or events.

Entuity gathers the requested information and presents it in a AR System form (opened on the same machine as the Entuity client).

3) When necessary complete the AR System form and save it.

On the form open *Notes*, to view details of the event, including the URL that links back to the event source in Entuity. When the AR is for more than one event then *Description* details each event in turn.



When accessing the AR System through a browser the event source URL is not available as a hyperlink. To use a URL copy it to a web browser *Address* field.

Firefox *	• ×
👹 century.entuity.local: Entuity Ltd. 🛛 🔯 BMC Remedy (Search) 🗙 +	
BMC REMEDY IT SERVICE MANAGEMENT Welcome, EYE User	A
Incident	
O         View Broadcast         Mentification and Recording         Investigation and Diagnosis         Resolution and Recovery         Recovery         Redent Closure         Closed	
Outlin Antine District Antine	
Unck Addott Incident ID*+ NC0000000215 S S Pedadotsings Date/System	
Assign to Me Company*+ Entuity	
Auto Assign Customer*+ User, EYE Q & 2 P	Prefere
Broadcast Incident Contact+	=
Create Relationship to	
Create Related Request	
Template+	
Zustomer's incodents Summary* Event Incident from Eye Event Incident from Eye Event Incident from Eye Event Incident from Eye Event Incident I from Eye Event	
Detais: IUUT-2061 (Intreshold=20.00), outUti=99.10	
Process Overview Service*+ (threshol=00). Impacted:	
Select Operational CI+ Time: Fri Aug 09 14:25:25 2013.	
Select Product Target Date URL: http://century.entuity.local/EOS/cgi	
Impact* 3-Moderate/Limited // Er Edunicitier /-user Faultini,-starteopener, eosObject/01.4.14.0	
Urgency* 3-Medium	
Details Priority* Medum	
Incident Type* Infrastructure Event	
Functions Reported Source Direct Input OK Cancel	
Search Knowledge Base	
Create Knowledge Assigned Group** Entuty Support	
Cocision Tree Assignee+ EYE User 🔍 🤇	

Figure 12 AR with Multiple Event Descriptions in Remedy

### Generating ARs from the Web UI

From the web UI you can generate ARs wherever you can highlight a managed object, for example from the Explorer tree, maps and the results of a Search.

To forward object details from the Entuity Search tool:

- 1) From the Search tool's results panel highlight the object(s) and open the context menu.
- 2) Click BMC AR Remedy System and then the appropriate command:
  - **Raise Multiple Incidents**, to raise one AR for each highlighted object.
  - **Raise Single Incident**, to raise one AR for all of the highlighted objects.

Entuity gathers the requested information and presents it in a AR System form (opened on the same machine as the Entuity client).

Sentuity User: admin@ent/onppvm01 [Logout Page Updated: 00:05:46, GMT Page Updated: 00:05:46, GMT											(Loqout) I		
Dashboards	InSight Center	Explorer	Events	Maps	Charts	Flows	Reports	Tools	Administration H	elp 1	0.66		2
Search Search String View	All 10.66 All			• •	Results Source aruba600 10.66,12	1 - 189 o 0.bvt.entui	Matching Polled IP A	Attribute	Context System Object Ident System Object Ident	View All Obj	jects, Asia, Asia jects, Asia, Asia	Server entlonppvm01 entlonppvm01	
String Match ( Regular Exp Match Whole Match Case	<b>Options</b> ression e Attribute	12			10.66. 10.66. 10.66. 10.66. 10.66. 10.66. 10.66.	Configurat BMC Remo Configurat Explore Remote T Show Live Show Ope	tion Manage edy AR Syste tion Monitor "erminal Status en Incidents	ment ► m ►	System Object Ident System Object Ident Raise Multiple Inci Raise Single Incide System Object Ident	All Obj All Obj dents All Obj All Obj All Obj All Obj	jects, Asia, Asia iects, Asia, Asia ts, Asia, Asia ts, Asia, Asia jects, Asia, Asia jects, Asia, Asia jects, Asia, Asia jects, Asia, Asia	entlonppvm01 entlonppvm01 entlonppvm01 entlonppvm01 entlonppvm01 entlonppvm01 entlonppvm01	
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Figure 13 Advanced Actions Available from the Search Tool

3) When necessary complete the form and save it.

## 5 Automatically Generating Action Requests

You can configure Entuity to automatically generate Action Requests (AR) for an AR System servers. The trigger for the raising of an AR is the raising of an event which has an associated advanced action configured through the Entuity Integration for BMC Remedy AR System integration.

## Automatic ARs are Created from Entuity Events

When Entuity raises an event it checks against the forwarding filter as to whether the event details should be forwarded to the AR System, specifically is the raised event:

- In the specified view, e.g. in the sample configuration All Objects.
- Of the specified type, e.g. in the sample configuration all events are passed.

Only when both conditions are met is event information passed to the specified form on the AR System, with the summary details prefixed by **Automated Event** to identify the AR as automatically generated.



In the sample configuration the All Objects view and all event types are specified, which would result in all events received by the Entuity server resulting in ARs. Entuity recommend changing the view to a more restricted view, through remedyforkevent.cfg.

Firelox *	-							-	- • • ×
BMC Remedy (Search)	+								
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NC00000000215 User	EYE Event inc	ident from Eye (century.entuity.local)			Medium	Assigned	Entuity Support	EVE User	<b>^</b>
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	Incident Type*	Infrastructure Event							
Functions	Reported Source	Direct Input 💌		JI					
Search Knowledge Base				51					
Create Knowledge	Assigned Group*+	Entuity Support	•						
<		ter en co							

Figure 14 Entuity Events as Automated ARs

### Controlling Which Events Result in Automatic AR Generation

Through a combination of Entuity view and advanced action configuration Entuity Integration for BMC Remedy AR System determines when an event raised in Entuity results in the automatic creation of an AR.

Entuity views allow you to control the combination of managed objects and event types that can result in a view. Through remedyforkevent.cfg you define the connection to this view, allowing forkevent to forward event information to the AR System. Through sw\_remedy70\_menu\_def you can configure an additional event filter, so not all events raised in the view result in an AR.

#### Using Entuity Views with Automatic AR Generation

Entuity views allow you to control both the objects displayed, and the events displayed through two filters:

- An object filter that only permits those objects against which you would want to raise ARs.
- A view filter, through which you select which type of events are displayed against the managed objects in the view.

When you have set up a view you must still configure forkevent to use that view, through the connection section of remedyforkevent.cfg.

Entuity recommend you tightly control the number of managed object - event combinations that can result in automatic AR generation.

For details on view creation and management see the *Entuity User and System Administrator Guide*.

#### **Configuring Advanced Action Filters**

By default the event filter available with the Advanced Action uses wildcards (asterisks) for event group and event identifiers, allowing events of all types through to the AR System:

```
[MenuItem Event_Menu1_ARSingleRemedyForkEvent_HD]
.
supportedEventTypes=*:*
.
```

You can adjust the event filter to only forward explicitly specified events, for example:

```
supportedEventTypes=512:7
```

uniquely identifies the Network Outage as 512 is its event group identifier and 7 is its event identifier. (See the *Entuity Event Reference Manual* for details on Entuity event groups and identifiers.)

You can identify more than one event type, using commas to separate each event:

```
supportedEventTypes=1024:800,1024:802
```

respectively identifies AP Host Count High and AP Host count Low events.



Entuity recommend you consult your Entuity Support representative before amending Advanced Action configurations.

## 6 Opening Entuity From an AR Server

From an AR System server you can open an Entuity originated AR, and drill back to the source managed object using a URL.

## **Understanding Entuity URLs**

The sample implementation sends a URL as part of the AR. The URL identifies the:

- Entuity Server that manages the object.
- Entuity CGI that launches Entuity.
- Entuity user account that originated the AR, although not the account password.
- Managed object that is the root of the AR.

#### For example:

```
http://10.44.1.126/EOS/cgi/EYELauncher?--user=admin;--start=opener;--eosObjectID=1.48.17.8890
```

can be understood as:

- http://10.44.1.126/, identifies the location of the Entuity web server.
- EOS/cgi/EYELauncher, identifies the cgi that launches Entuity.
- --user=admin; , identifies the user account logging into Entuity as admin. When you want to login using a different account amend the URL here, as it cannot be amended through the login dialog.
- --start=opener; opens Entuity.
- eosObjectID=1.48.17.8890 identifies the Entuity managed object. Managed object identifiers can have one of two formats in Entuity:
  - -1.-1.-1.<objectId> (e.g. -1.-1.-1.34)
  - *object1.object2.object3.object4,* e.g. 4.12.0.0 for a device, 1.48.17.8890 for a port.



Each managed object has a unique identifier that can be viewed using Flex Reports.

## **Opening Entuity from AR System**

To open Entuity from AR System:

- From the AR open Notes. AR System displays a full description of the AR. Depending upon whether you are accessing the AR through the mid tier or through a browser the AR's URL is available either as a hyperlink or a text string.
- 2) When the URL is a:
  - Hyperlink select the hyperlink.

Text string, copy the URL and paste it into a browser address field, and press Return. Entuity launches Entuity on the same host as the AR System client, with the focus on the managed object that is the source of the AR.

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Assignment Script	Status*	Assigned	•					

Figure 15 Opening Entuity from an AR System

## Appendix A Remedy AR System Configuration

Entuity recommend using configure to set up your Entuity Integration for BMC Remedy AR System integration. You can use this appendix to understand how your system is configured. Where you want to substantially amend the default integration Entuity recommend you can contact Entuity Support.

Configuration of the Entuity Integration for BMC Remedy AR System integration is through application of these types of configuration file:

- Advanced Action Configuration, e.g. sw\_remedy70\_menu\_def.cfg, details user menus for interactive AR generation and the type of information gathered for both interactive and automatic AR generation. This is applied to the Entuity server.
- Event Action Configuration, e.g. remedyforkevent.cfg, specifies automatic AR generation through the forkevent process and EventActionApplication.
- arforward Configuration, e.g. arhelpdsk.cfg and arhelpdsk\_global.cfg, maps the extracted Entuity data to the target AR forms. arforward was developed using the Remedy API.
- AR System server connection, e.g. arhelpdsk\_server.cfg, details parameters required to connect to the AR System server.

Entuity is supplied with sample configuration files that allow integration with the default Remedy Help Desk application:

- sw\_remedy70\_menu\_def.cfg, details the extensible menu configuration.
- remedyforkevent.cfg, requires amending of Entuity user and view details.
- arhelpdsk70.cfg and arhelpdsk70\_global.cfg, requires amending of connect details to the AR System server. Details of the AR System forms and fields Entuity information is passed to can also be amended, although for a default sample integration that is not required.
- RemedyForkEventLoggerConf.xml, sets the logging level of forkevent and does not require amending.

This appendix details the changes required to the sample files to integrate them with an existing BMC AR Remedy System application. It also indicates how to amend these files to work with other AR System applications.

After the configuration files are applied the integration is ready to use.

## **Configuring Advanced Actions**

The AR System menu is a configurable user menu. It determines the user menus available through the Entuity client and the type of data collected from Entuity's database when generating ARs, both interactively and automatically. The sample integration is supplied with one user action configuration file, sw\_remedy70\_menu\_def.cfg.

It is also through the user action configuration that the types of events that can result in an automatically generated AR are determined:

supportedEventTypes=\*:\*

where \*:\* is *EventGroupID:EventID* indicates all event groups and all events within those groups are enabled (see the *Entuity Events Reference Manual* for details of event identifiers).



Currently user menu configuration functionality is restricted to Entuity. Contact your Entuity representative if you require amendments to the AR System menu.

## Configuring the AR System Server Connection

Entuity data extracted by EventActionApplication is ready to be forwarded to one or more AR System servers and to one or more AR System applications. The AR System configuration files, by default arhelpdsk\_server.cfg is a plain text file with a connection section which identifies the AR System server(s) and how they can be accessed.

#### **ARServer Connection Section**

The ARServer Connection specifies the server(s) and applications arforward establishes a connection with, and the method of that connection. This section has the format:

```
[ARServer]
Server=10.44.1.103
MidTier=10.44.1.103
User=Demo
Pass=
#Auth=
#Port=2001
#Rpc=
Ssl=0
SchemaList=ARHelpDesk
```



This sample section includes commented out arguments, i.e. those prefixed by #.

Where:

- Server is a mandatory field that identifies the AR System server where ARs are created. This must be an AR System server that is known to the Remedy Mid Tier to which interactive integration connects. Ensure the network DNS settings are configured so the AR System server is visible to the Entuity server.
- User, Pass and Auth are the AR System user account details required for communication with the AR System server. These settings should meet the requirements for communicating with the Remedy Mid Tier and have permissions for both submitting and viewing the forms used in the integration on the name AR System servers.



You can also specify user account details through the user action configuration file; user accounts defined there take precedence. However Entuity recommend only setting user details, here, in the AR System configuration file.

- MidTier specifies the Remedy Mid Tier server and optionally the port if the Mid Tier is not using port 80. When not specified Server is used (and the default port 80).
- Port specifies the TCP port used by the AR System server. It is only required when the AR System server is not using a portmapper.
- Rpc is only required when communication is with a private AR System server queue.
- Ssl is only required when communication to the Remedy Mid Tier is through SSL, and then it must be set to 1.
- SchemaList specifies one or more Schema section identifiers. Multiple section identifiers are comma delimited.

## Configuring for the AR System Schema

The AR System schema configuration file is a plain text file with two section types:

- ARServer Connection section identifies the AR System server and how it can be accessed (defined in arhelpdsk.cfg)
- Schema section identifies the different AR System applications to which data is forwarded. It also maps the Entuity data to the appropriate fields in the AR System (defined in arhelpdsk70.cfg and arhelpdsk70\_global.cfg).

### **Schema Section**

Each application form to which Entuity forwards data must be identified in *SchemaList* and then detailed in its own section. These sections:

- Identify the AR System application to which data is forwarded.
- Map the Entuity data to the appropriate fields in the AR System.

The AR System section has the format:

[ARHelpDesk] Form=HPD:IncidentInterface\_Create

View=Dialog

Mappinglist=ARAction,

- = ARSubmitter,
- = ARSummary,
- = ARLongDescr,
- = ARImpact,
- = ARUrgency,
- = ARFirstName,

- = ARLastName,
- = ARStatus,
- = ARServiceType,
- = ARReportedSource,

ResultForm=HPD:Help Desk

ResultLink=100000161

#### Where:

- [ARHelpDesk] is the schema name which must be listed in SchemaList. Schemas not included to SchemaList are not applied to arforward.
- Form identifies the AR System form to which data is to be forwarded.
- View is the AR System view. It is only required if a View is required when connecting through the Remedy Mid Tier.
- MappingList identifies the mapping sections between the Entuity and AR System data fields. Multiple mappings are comma-delimited.
- ResultForm, identifies the AR System form in which the new incident details are displayed. When a form is not identified the details are displayed in the form to which it was written.
- ResultLink, where a result form is specified the user must give a field that is common to both forms and whose value uniquely identifies the identifier of the result form.

Together *ResultForm* and *ResultLink* allow Entuity Integration for BMC Remedy AR System to submit data using one form, and view the created AR System incident in a second results form.

#### A Field Mapping section has the format:

```
[ARServiceType]
Field=1000000099
Value=Infrastructure Event
Datatype=4
```

#### Where:

- [ARServiceType] is the mapping name which must be listed in MappingList. Mappings not included to MappingList are not applied to arforward.
- Field specifies the numeric identifier of the AR System application field that is to be updated.
- Value specifies the value written to AR System application field. This can be a:
  - literal value, e.g. Infrastructure Event.
  - format string that takes values from forkevent and uses them as input parameters to arforward.

- Datatype specifies the AR System database data type for the field using its numeric value.
   For example, 0 indicates a null value:
  - 0, NULL value
  - 1, Keyword
  - 2, Integer
  - 3, Real
  - 4, Character
  - 5, Diary
  - 6, Enumeration
  - 7, Time
  - 10, Decimal
  - 13, Date
  - 14, Time of day.



Always consult AR System documentation.

The previous field mapping extract example identifies the AR type as Infrastructure Event. The sample ARs are all of that type. The following field mapping extracts illustrate how different types of information can be passed to the AR System application.

To use field values you must use the \$n notation. In the sample integration arforward extracts two values:

- \$1, a short description of the raising event or managed object
- \$2. the fuller description of the raising event or managed object.

These parameters are associated with AR form fields, for example this section:

```
[ARSummary]
Field=1000000000
Value=$1
Datatype=4
```

Passes the value of \$1, which for automatically generated ARs is the event identifier, to the Help Desk Description field, identified as field 1000000000.

Value can handle combined literal and format string parameters. For example:

```
Value="Received automatic incident " + $1
```

is displayed in the target AR System field as:

```
Received automatic incident Event AvailMonitor Node Down occurred on 10.44.1.126
```

Where:

- "Received automatic incident " are literal strings. Notice they include the spaces necessary for a well formed layout.
- \$1 is a parameter with the value Event AvailMonitor Node Down occurred on 10.44.1.126.
- + is the conjugating symbol.

#### **Using AR System Alias**

When the field is an enumeration or a selection list, and if alias has been configured in the AR System Server, it can be used instead of the numeric value of the enumeration. In this example Datatype=2 so the AR System field identifier is set to an integer value:

```
[ARSource]
Field=1000000215
Value=4
Datatype=2
```

In this example Datatype=2 so the AR System field identifier is set to a character alias:

```
[ARSource]
Field=1000000215
Value=Systems Management
Datatype=4
```

#### Using AR System Keywords

The next example shows an AR System keyword being used as the value for an AR field:

```
[ARSubmitter]
Field=2
Value=1
Datatype=1
```

Datatype=1 indicates an AR System keyword and the keyword is a value by integer 1 (\$USER\$) so the current user name is the value of this field.

#### Mapping Entuity Severity Levels to AR System Severity Levels

The next example shows how to map Entuity Severity Levels to AR System Severity Levels. The ARImpact section includes a Mapping parameter which references the SeverityMap secton. The SeverityMap section maps Entuity event severity levels to AR System incident severity levels. The severity is mapped by inclusion of the line EntuityField=Severity.

```
[ARImpact]
Field=1000000163
Value=3-Moderate/Limited
Datatype=4
Mapping=SeverityMap
```

```
[SeverityMap]
EntuityField=Severity
event_severity_info=4-Minor/Localized
event_severity_warn_low=3-Moderate/Limited
event_severity_warn_medium=3-Moderate/Limited
event_severity_warn_high=2-Significant/Large
event_severity_critical=1-Extensive/Widespread
```

#### Sample AR System Server Configuration

This sample configuration file is supplied with the Entuity Integration for BMC Remedy AR System Integration.

```
# This configuration file maps the following command line parameter
list:
```

# arforward -file \${EntuityInstall}/etc/arhelpdsk70.cfg -user UserName
[-pass Password -auth Auth -port Port -rpc RPC] -plist -pl "Short
description text" -p2 "Long description text"

# This line includes the file containing the ARServer connection

!arhelpdsk\_server.cfg

# In order for the creation of the Incident to succeed using these fields, automatic assignment group must be configured on the Remedy server.

# This example section shows a create form, and a display form which share a mutual field. In the case of # HPD:Help Desk, the Incident Id field 1000000161 is populated by workflow behind the IncidentInterface form when the entry is successfully created.

[ARHelpDesk]

Form=HPD:IncidentInterface\_Create

View=Dialog

Mappinglist=ARAction,

- = ARSubmitter,
- = ARSummary,
- = ARLongDescr,
- = ARImpact,
- = ARUrgency,
- = ARFirstName,
- = ARLastName,
- = ARStatus,
- = ARServiceType,

ResultForm=HPD:Help Desk

#### ResultLink=100000161

# The above MappingList uses some of these fields: for each field that is to be populated, list it in the MappingList and supply the Field number, the Field datatype and the Field value.

```
[ARIncidentId]
```

Field=100000161

Value=13

Datatype=1

[ARSubmitter]

Field=2

Value=1

Datatype=1

[ARSummary]

Field=100000000

Value=\$1

Datatype=4

[ARLongDescr]

Field=1000000151

Value=\$2

Datatype=4

[ARImpact]

Field=1000000163

Value=3-Moderate/Limited

Datatype=4

Mapping=SeverityMap

```
[SeverityMap]
```

EntuityField=Severity

event\_severity\_info=4-Minor/Localized

event\_severity\_warn\_low=3-Moderate/Limited

event\_severity\_warn\_medium=3-Moderate/Limited

event\_severity\_warn\_high=2-Significant/Large

event\_severity\_critical=1-Extensive/Widespread

[ARUrgency]

Field=100000162

Value=3-Medium

Datatype=4
Entuity

[ARPriority] Field=100000164 Value=Medium Datatype=4 [ARFirstName] Field=100000019 Value=EYE Datatype=4 [ARLastName] Field=100000018 Value=User Datatype=4 [ARPhone] Field=100000056 Value=0044(0)2074444829 Datatype=4 [ARStatus] Field=7 Value=New Datatype=4 [ARReason] Field=100000881 Value=Request Datatype=4 [ARReasonHidden] Field=100000150 Value=Request Datatype=4 [ARServiceType] Field=100000099 Value=Infrastructure Event Datatype=4 [ARSource] Field=100000215 Value=Systems Management Datatype=4

[ARAction]
Field=100000076
Value=CREATE
Datatype=4
[ARReportedSource]
Field=1000000215
Value=Direct Input
Datatype=4

# Appendix B Entuity AR System Installation Files

# Entuity Integration for BMC Remedy AR System Integration Files

Entuity Integration for BMC Remedy AR System is supplied with your standard Entuity installation. The installed Entuity Integration for BMC Remedy AR System Integration includes:

- Template files installed to entuity\_home/install/template/etc:
  - arhelpdsk\_server.cfg
- Sample configuration files that integrate with the default AR System HPD:HelpDesk form. These are in *entuity home*/etc/:
  - arhelpdsk70.cfg
  - arhelpdsk70\_global.cfg
  - sw\_remedy70\_menu\_def.cfg
  - remedyforkevent.cfg
  - RemedyForkEventLoggerConf.xml.
- File generated after configure in entuity\_home/install/template/etc:
  - arhelpdsk\_server.cfg
- Files in entuity\_home/integ/Remedy/:
  - arforward.exe.



In Linux installs arforward.exe is a 64-bit executable and arforward\_32.exe is the 32bit version. If you want to use the 32-bit version then you must rename it to arforward.exe.

# **Renaming Integration Configuration Files**

The sample configuration files are overwritten with each new Entuity installation. When you want to use the sample configuration in a live installation you can either take a backup of your files and reinstall them after each upgrade, or consider the supplied files as templates that you should amend after amending them. When renaming files remember to edit the content, so any references to these files are also amended.

Rename the sample files and settle on a standard naming format, for example:

- sw\_remedy70\_menu\_def\_NEWNAME.cfg
- remedyforkevent\_NEWNAME.cfg
- arhelpdsk70\_global\_NEWNAME.cfg
- arhelpdsk70\_NEWNAME.cfg
- arhelpdsk\_server\_NEWNAME.cfg. It is automatically created during configure, however if the file already exists it is not overwritten. This file only requires renaming when configuring multiple servers.

#### Entuity

You must also rename any references to these files within the configuration files. For example, in:

- sw\_menu\_def\_file\_list.cfg, include sw\_remedy70\_menu\_def\_NEWNAME.cfg.
- sw\_remedy70\_menu\_def\_NEWNAME.cfg, rename the references to arhelpdsk70.cfg and arhelpdsk70\_global.cfg to arhelpdsk70\_NEWNAME.cfg and arhelpdsk70\_global\_NEWNAME.cfg.
- remedyforkevent.\_NEWNAME.cfg, rename the references to RemedyForkEventLoggerConf.xml to RemedyForkEventLoggerConf\_NEWNAME.xml.
- arhelpdsk70\_global\_NEWNAME.cfg and arhelpdsk70\_NEWNAME.cfg appropriately rename the arhelpdsk70\_server\_NEWNAME.cfg includes.
- startup\_O/S\_site\_specific.cfg. Copy from startup\_O/S.cfg the Remedy section and rename the reference to RemedyForkEvent.cfg to RemedyForkEvent\_NEWNAME.cfg.

# Entuity Integration for BMC Remedy AR System dlls

For this module to run you should ensure these dlls are available in the run time path on the Entuity server:

- dlls for Windows installations, available in entuity\_home/integ/Remedy/lib and usually installed in /systemWOW64:
  - arapi70.dll
  - arut170.dll
  - icuin32.dll
  - arrpc70.dll
  - icudt32.dll
  - icuuc32.dll
  - msvcr71.dll
  - msvcp71.dll
- dlls for Linux installs, available in entuity\_home/integ/Remedy/lib:
  - libar.so
  - libicudatabmc.so.32
  - libicui18nbmc.so.32
  - libicuiobmc.so.32
  - libicuucbmc.so.32

# Appendix C Configuring Automatic AR Generation

The default installation of Entuity Integration for BMC Remedy AR System allows interactive AR generation. For automatic AR generation, you must also configure and run forkevent.

forkevent is configured through its own event action configuration file
(remedyforkevent.cfg), to forward event information to the
EventActionApplication. Specifically forkevent:

- 1) Uses details in the [connection] section to register with the event management process. forkevent becomes a client, the Entuity server only forwards to forkevent those events in the registered view.
- 2) Uses details in the [pipe\_remedy] section when calling EventActionApplication. forkevent structures the event details, and sends the data to EventActionApplication using the stdin of the pipe process.



You can also run more than one forkevent process at one time, although they must use different configuration files. For details contact your Entuity Support representative.

EventActionApplication uses the default configuration, specifically:

- EventActionApplication uses the appropriate menu in sw\_remedy\_menu\_def\_menu.cfg to build a complete parameter list from forkevent's direct data and StormWork's event object details and Entuity host/user information.
- 2) EventActionApplication builds a string that contains the returned parameters and then passes it to the forked process arforward.

# **Configuring forkevent**

#### **Pipe Process**

forkevent communicates with the database using Pipe, each time forkevent recognizes an event it sends the event data to the stdin of the Pipe process. The format and structure of the event data is taken from the [data] section in the configuration file.

The Pipe continues to run until it is explicitly stopped or the Entuity server is stopped. Each time a new event occurs the same forkevent process is used.

In Pipe mode forkevent sends event data in the format:

```
VariableLabel VariableValue <CR>
BlankLine <CR>
```

Where:

VariableLabel is the label assigned to the event data in the [data] section, e.g. Descr in Descr=\${event.PAPIDescr}.

- VariableValue is the event data value, extracted from the [data] section, e.g. \${event.PAPIDescr} in Descr=\${event.PAPIDescr}.
- <CR> is the end of line marker. Each value is passed on its own line.
- BlankLine is automatically sent at the end of the event data to signal the end of that event.

#### **Remedy forkevent Configuration**

The Entuity Remedy Action Request System Integration configuration file, e.g. RemedyForkEvent.cfg, contains details:

- Required to access the Entuity database.
- Used to determine the format and order event data is passed to the AR System.

There are a number of sections, each starts with its section name, enclosed within square brackets, e.g. [connection] and [data]. All variable definitions are held within sections. These sections can be divided into three types:

- Connection section contains details required to access the Entuity database (see Connection Section).
- Process section determines which parameters are passed. You can specify one or more process sections, which one is used is passed as an argument when running forkevent (see *Process Sections*).
- Data section details the event data passed to the Pipe process (see the Data Section).

Entuity supply a sample file, RemedyForkEvent.cfg. You should read this section and then take a backup of the file before attempting to amend it.

#### **Connection Section**

This section details the information required to access Entuity to collect event data. This is an example section:

[connection]
username=admin
view=All Objects
extendedEvents=1

#### Where:

- [connection] is the name of the section that contains the details required to access Entuity event data.
- username is the Entuity login name.
- view is the Entuity view from which events are collected, by default All Objects. Only when an event occurs on a managed object within the defined view is it forwarded by forkevent. All Objects includes all managed objects, Entuity advise changing view to a more restricted view to only include events from required objects.



username and view are the same details as used for accessing Entuity.

- extendedEvents sets the maximum number of characters that forkevent forwards for the event description. Event descriptions greater than this setting are truncated. When set to:
  - 0 (default), forwards event descriptions to a maximum of 127 characters
  - 1, forwards event descriptions to a maximum of 4095 characters.

#### **Process Sections**

The process sections define the pipe process and its arguments. A configuration file can have more than one process definition, although only one is used at any one time. This is passed as an argument when forkevent is run.

This is the sample process section:

```
[pipe_remedy]
start=${install.JAVA} -Dlog4j.configuration=file:${ENTUITY_HOME}$
{FPS}etc${FPS}RemedyForkEventLoggerConf.xml
=-cp ${ENTUITY_HOME}${FPS}lib${FPS}httpd${FPS}EOS${FPS}EOSServer.jar
{EPS}${ENTUITY_HOME}${FPS}lib${FPS}httpd${FPS}EOS${FPS}log4j.jar
=com.entuity.eos.menu.EventActionApplication
=period=1000 appname=RemedyForkEvent userid=${activeuser}
webport=${webportnum}
args=
type=pipe
directory=${LOGDIR}
```

Where the following arguments may be passed to the menu application:

- [pipe\_remedy] is the section name. This is passed as a parameter with the forkevent command.
- start runs the specified application with the set arguments:
  - maxactions, the maximum number of concurrently executing menu actions, by default 15. Once exceeded Entuity queues remaining actions. It is optional, but when set must be 1 or greater.
  - timeout, the time after which an executing action can be removed from the pool and queued actions run. A timeout action can be terminated, or left for execution based on the value of *terminate*. 0 indicates no timeout, the default is 900000 ms, 15 minutes, and the minimum value is 100 ms.
  - terminate, when set to true, the default, terminates a timed-out action, false allows the action to complete.
  - period, specifies the minimum amount of time in milliseconds that must elapse between action executions, and is used to control throughput of action executions and system load. The default is 1000.
  - dshost, IP address or hostname of the Entuity StormWorks server, by default

localhost.

- *dsport*, Entuity StormWorks port, the default is 5467.
- dstimeout, timeout for the Entuity StormWorks database connection. The default is 60 seconds.
- appname, name of the application forkevent runs to gather the AR System data.
- userid, the account name used to access Entuity.
- clienthost, application's IP address, by default localhost.
- eyeserver, IP address or hostname, and port of the Entuity web server, by default localhost:80. This attribute is used in place of *webport* but can also make use of it, for example where keli is the Entuity server hostname:

eyeserver=keli:\${webportnum}

- webport, the port on which the Entuity web server is accessible, by default 80.
- args allow you to pass commandline arguments with the Pipe and Fork processes. They are not used with the Entuity Integration for BMC Remedy AR System integration.
- When type is pipe, start runs as soon as forkevent runs, creating the Pipe process.
- EmptyVariable is used to enter a value in an event variable passed from Entuity that does not contain any data, i.e. to make it easier to identify in the integrated package. By default EMPTY\_VARIABLE is entered, using EmptyVariable you can replace that with one of your choice, e.g. MISSING VALUE.
- directory is the directory from which the process is run and log files are written to.
- *loglevel* is the level of logging information recorded, i.e. errors, warning, info, debug and all.

#### **Data Section**

This section holds the associations between labels and Entuity event variables. These labels can be used by the Pipe process to identify and manipulate event data. There must only be one data section in an Event Forward configuration file.



The data section is only used with the Pipe process. The Pipe process runs continually and it is only through the data section that arguments can be passed for each event. The Fork process is started for each event, and so arguments are passed each time an event occurs.

This is an example section:

```
[data]
event.PAPIId=${event.PAPIId}
event.PAPIEventGroup=${event.PAPIEventGroup}
event.PAPIEventId=${event.PAPIEventId}
event.PAPIEventStr=${event.PAPIEventStr}
event.PAPItimeStamp=${event.PAPItimeStamp}
event.PAPIObjectID_1=${event.PAPIObjectID_1}
event.PAPIObjectID_2=${event.PAPIObjectID_2}
```

```
event.PAPIObjectID_3=${event.PAPIObjectID_3}
event.PAPIObjectID_4=${event.PAPIObjectID_4}
event.PAPIpriority=${event.PAPIPriority}
event.PAPIAttr=${event.PAPIAttr}
event.PAPIDescr=${event.PAPIDescr}
event.PAPIImpact=${event.PAPIImpact}
event.PAPIImpactDescr=${event.PAPIImpactDescr}
event.PAPIDetails=${event.PAPIDetails}
```

#### Where:

- *[data]* is the mandatory name of the data section.
- \${event.PAPIID} is a numeric value specifying the current instance of the event.
- \${event.PAPIEventGroup} is a numeric value specifying the event's group.
- \${event.PAPIEventID} is the event identifier within the context of the event group.



The combination of event group and event ID uniquely identify all Entuity event types (see the *Entuity Event Reference Manual*).

- \${event.PAPIEventStr} is the description of the event associated with the event identifier.
- \${event.PAPItimestamp} is the time the event occurred, represented as UTC (Coordinated Universal Time, i.e. the number of seconds since 1970-01-01 00:00:00 GMT).
- \${event.PAPIObjectID\_1}, \${event.PAPIObjectID\_2} and \${event.PAPIObjectID\_3} and \${event.PAPIObjectID\_4} are internal values that indicate the origin of the event.
- \${event.PAPIpriority} is retained for backward compatibility.
- \${event.PAPIAttr} is an internal numeric attribute, not used for the integration.
- \${event.PAPIImpactDescr} lists entities likely to be affected by the event, e.g. hosts, VLANs and monitored applications.
- \${event.PAPIDescr} is a textual description of the managed object on which the event occurred, e.g. VLAN, device, module or port.
- \${event.PAPIDetails} is supplemental information on the particular event, e.g. actual values of network statistics which caused a threshold event.

# **Java Fork Process**

forkevent communicates with the AR System servers through EventActionApplication. Each time EventActionApplication forwards data to arforward it generates a new Fork process. As the process is created arguments detailing the event are passed to arforward (the forked process). You can pass these arguments through *start*.

When the data is sent the process is closed. Each AR has its own Fork process.

# 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

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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

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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.

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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 email, 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

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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.

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#### 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.

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