

# **Atea Voice Management System (VMS)**

## **Technical Reference**

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## Document History

Date	Author	Version	Summary
12 Sep 2016	Murray Lum	Vo.1b	Initial draft
16 Sep 2016	Callum Katene	Vo.1c	Minor corrections and updates relating to administration portal, authentication options, backup options
17 Sep 2016	Murray Lum	V7.1a	Edits for clarity. Ready to be issued.
10 Oct 2016	Murray Lum	V7.1b	Increased CPU to 4 virtual CPU to improve performance
Apr 2019	Murray Lum	V7.2a	Updated for 7.2

## Related Documents

Document	Description
VMS User Guide 7.2	User guide for version 7.2 of VMS
VMS7 Administration Guide	Administration guide for version 7.x of VMS
AteaSystems.com How to articles	Tips and instructions for using the VMS and running reports

## 1 Purpose of this guide – VMS planning information

This document is for customers who plan to install the Atea Voice Management System (VMS).

The VMS is a business reporting tool enabling you to use vital information from your telephone system. The reports help managers in the areas of cost management, call investigation, staff responsiveness and network engineering.

This guide is intended for solution architects, network architects, designers, and implementation engineers. It contains design information and many of the default application settings, such as network communication ports.

## 2 VMS Overview

The VMS provides reports from the telephone system. The VMS gathers information from the Cisco UCM to extract information about phone calls, and process this into reports. The main report categories are:

- **Cost accrual reports** – for call cost information. These show the cost of the calls for each department, and allow you to drill down to more information about who made the calls and when. There is also a report on the most expensive calls to help you manage your costs.
- **Investigation reports** – for finding out about who is making or receiving calls. You can also identify how the people in your organisation behave, including who makes the longest calls, whether calls are answered promptly, or what phone numbers are the most frequently called. Number range and extension range lists help filter the calls to the ones you are most interested in.
- **Hunt group analysis** - provide a view of your call answering performance and statistics. This includes information based on a time to answer target (SLA), call volumes and durations. These reports are similar to contact centre style reports.
- The **engineering and gateway analysis** reports provide information on technical performance such as QOS call quality of service scores. There is detailed information right down to individual call legs. The gateway reports are for analysing the traffic at each gateway and where it came from.

The User Guide describes each report.

## 3 VMS Architecture

The Atea VMS application runs on the Atea TSP server. Atea provide the TSP as a virtual machine. It's an Oracle Linux server complete with:

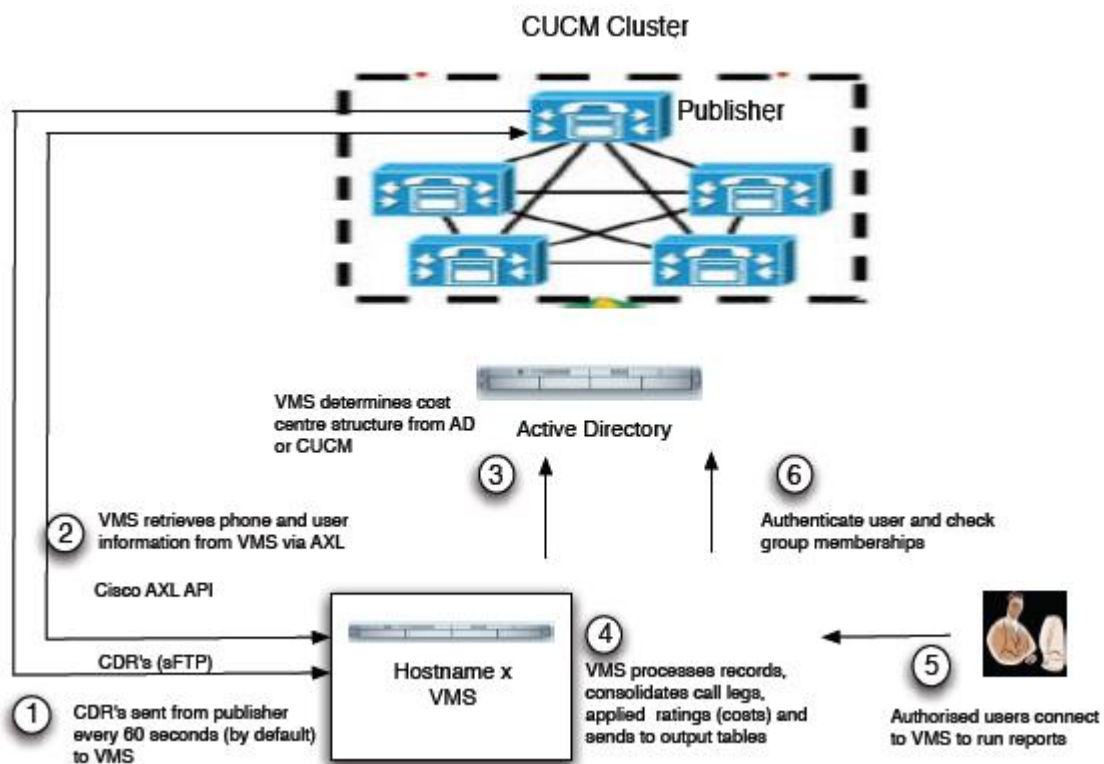
- An Oracle database and application environment

- A Tomcat web server
- An Open LDAP directory
- Other supporting applications such as the Java run time environment, SFTP and SSH.

The Atea applications are written in the Java environment and reside within the Tomcat web server.

### Record processing

Call detail records are sent from the CUCM Publisher to the VMS, usually every few minutes, where they are stored for processing. When processing, the VMS also queries the CUCM for phone and user information using the AXL API. Cost centre information may also be collected from AD. Processing is usually done once a day at around 1am. The call legs are consolidated into calls, and where possible the calls are assigned to a single owner.



### Running reports

Users connect to the VMS web page to run reports. The VMS confirms whether they can run the reports by checking authentication and access rights with either the CUCM or with Active Directory (this is a configuration setting). The reports are generated on-demand. Some reports may also be scheduled to be automatically emailed.

## 4 VMS Components

The Atea applications reside in a Tomcat web server container which itself runs on Linux. These and other supporting applications are collectively referred to as the 'build' and are listed below (versions subject to change). Note that Atea supplies the entire build.

VMS version 7.2

Oracle Linux 7.6

Oracle-XE Database 11\* or Oracle-XE Release (18 or 19 – TBC)

Oracle-APEX 5

Tomcat 8.5

Java JRE 8

\* Oracle standard one or standard two can be used for larger implementations that require a database that is larger 11GB.

### 4.1 User Authentication - options

Users are authenticated before they can access the reports.

VMS7 supports two user authentication options

1. **Local Authentication** – VMS7 includes a user account administration tool. An administrator can use this tool to create user accounts, manage user passwords and assign privileges.
2. **Active Directory** – Users can use their existing AD/LDAP accounts to authenticate and access VMS7. Permissions are assigned using AD group membership.

### 4.2 User information – like name and department

The reports use information about the users, including first and last names, user IDs and departments.

Our default configuration retrieves the following fields from the CUCM:

CUCM field	Default Report use
User ID	User's unique identifier. Used to link calls to users when using extension mobility.
Last Name	Last name of user. Presented in reports along with the first name to identify the user. May also be used to identify non-human entities such as fax machines

CUCM field	Default Report use
First Name	First name of user. Presented in reports with last name. May also be used to identify non-human entities such as fax machines
Manager	Available for additional identification, often as a sub-level to department, such as cost centre codes.
Department	Used to indicate the users' department or another logical/physical grouping e.g. Site, or building floor
Telephone Number	Where the user's telephone number is set, it is used to identify call ownership if standard call ownership techniques are insufficient

### 4.3 VMS gateway and rate administration

The VMS includes an administration portal to administer the gateways and call rates. From here, you can:

- Assign gateways as PSTN gateways
- Group gateways into gateway groups
- Create and edit call rates
- Assign the rates to gateways or groups
- Assign locations to gateways or groups

#### 4.3.1 VMS Gateway Management

The VMS automatically reads all gateways configured in CUCM. However, the VMS only uses the gateways that are activated within the VMS administration portal. Many processing and reporting features of VMS rely on the knowledge of the set of gateways used as PSTN gateways. You must use the VMS Administration Portal to register a CUCM gateway as a PSTN gateway.

**Gateway Groups** are sets of gateways that can be treated as a single ingress/egress point; For example, to apply a set of call rates to a specific service provider you can group all of the gateways to that service provider into a single gateway group, and then assign the relevant call rates to that group.

#### 4.3.2 VMS Rating information

Some VMS reports include call cost information. To produce these reports, the VMS must be configured with the call cost rates.

You can edit call rates from within the VMS Administration portal. However, if there are a large number of call rates to be added during system commissioning we can upload them for you. All we need is your rates in a CSV formatted spreadsheet, with these columns.

Column	Description
Prefix	PREFIX identifies the destination of a call. Any call where the final called party number matches this prefix is rated based on the rating values associated with this prefix. If no wildcard is present (%) the called number must match PREFIX exactly. The percent symbol "%" is a 'match any' wildcard. Two keywords used in this column are 'LOCAL' and 'NATIONAL'. They are used to identify the rating information for local and national calls. Note that your CallManager may include the 'outside line' prefix in the called party number. If it does, it must also be included in values in this column.
Destination	This appears in the reports to identify the destination that is associated with the PREFIX. For example, we can use the destination "Australia" with the prefix '0061%' (+61 is the country code for Australia).
Type	Another way to categorise calls, the TYPE column contains information about the type of a call based on its destination. Examples are 'Toll Free' and 'International'.
Min Duration (seconds)	This is the minimum chargeable duration for a call (in seconds). If calls to a specific destination have a minimum charge of one minute, enter '60' in this column.
Rounding (seconds)	For the purposes of rating, call durations are rounded up to the nearest multiple of ROUNDING. The chargeable duration of some calls is rounded to the next minute, so that a 65 second call will be charged for 2 minutes (120 seconds). If calls are rounded to the next minute enter '60' here. If calls are not rounded, enter '1'.
Free Time (seconds)	Some calls incur no charge if the duration of the call is less than a predefined minimum. Enter the free time here, in seconds.
Fixed Cost	Some calls have a fixed cost unrelated to the length of a call. Enter the calls fixed cost in this column (in dollars).
Cost Per Minute	For calls that are charged by the minute, enter the cost per minute value in this column (in dollars).

#### 4.4 Scheduled report administration

Users can create scheduled reports to be emailed automatically on a day-of-week or day-of-month basis. An administrator can oversee these.

#### 4.5 Operational alerts – Issues will cause processing to halt

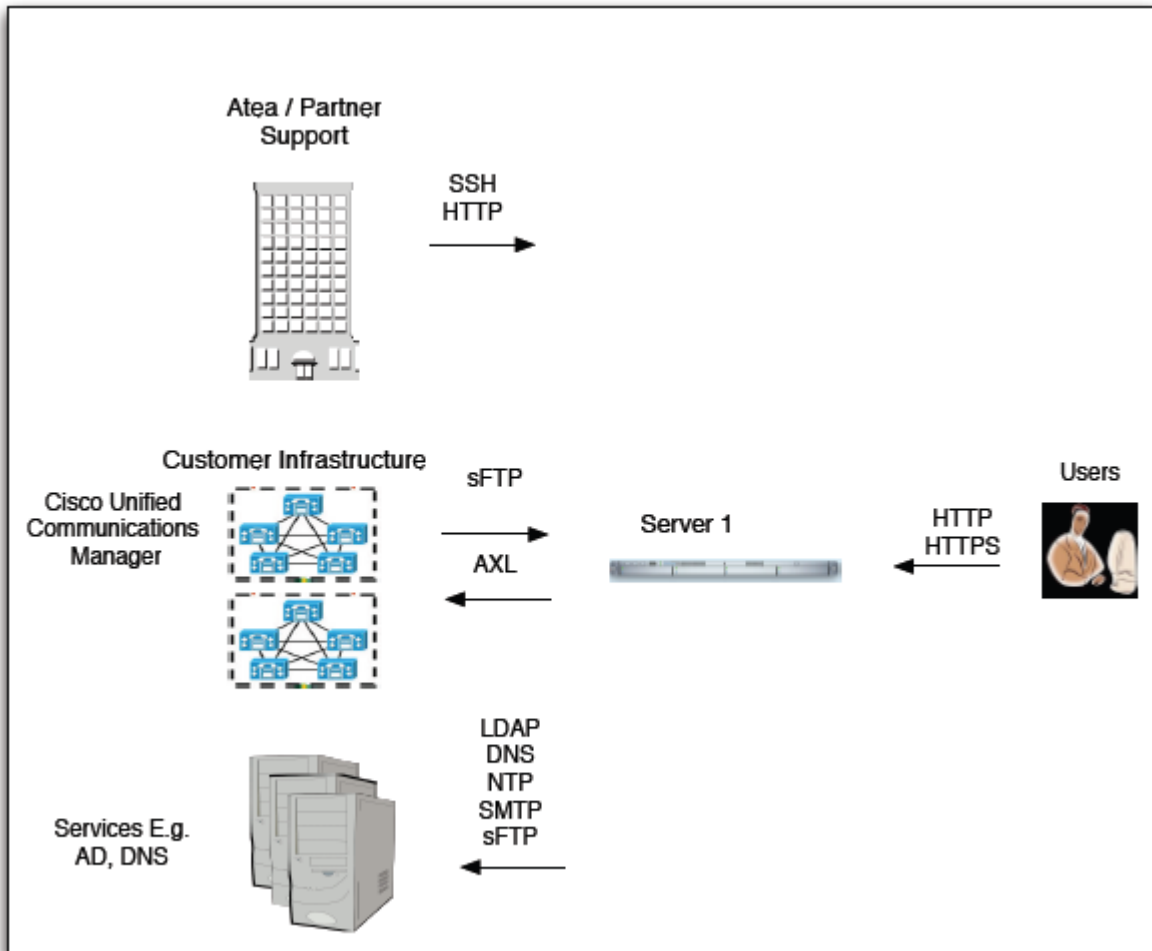
If there are issues with processing the CDR records, processing will halt as manual intervention is usually required to rectify the issue. However, reports for prior periods will continue to operate.



## 5 Network and Environment setup

### 5.1 Port Numbers

This diagram and table shows the communications and port numbers used by the applications. Configure the network and the relevant firewalls to allow these communications.



From	To	Port	Description
VMS User	TSP (server)	TCP 443	VMS Reports https only
TSP	CUCM	TCP 8443	CUCM AXL API
CUCM	TSP	TCP 22	CUCM CDR delivery
TSP	AD	TCP 389 or TCP 636	AD LDAP AD LDAP over TLS
TSP	DNS	UDP 53	DNS lookup
TSP	NTP	UDP 123	NTP time sync
TSP	SMTP	TCP 25	Email alerts, scheduled reports
TSP	Logging server	TCP 512	Syslog (optional)
TSP	SNMP server	UDP 161	SNMP (optional)

From	To	Port	Description
ATEA	TSP	TCP 22	Support (entry via VPN)

## 5.2 Email relay for scheduled reports and alerts

The VMS sends email for two purposes:

1. **Scheduled reports** – these are automatically emailed to the recipients
2. **System alerts** – for system based issues such as processing failures and database alerts. These may be emailed to both your internal customer support and our Atea email address for support.

To send the email, the VMS requires an SMTP gateway. You may also need to configure a relay or whitelist to send emails to external email addresses such as Atea support.

## 5.3 Remote access for support

We recommend that you provide Atea with remote access to the system for support, like updates and investigation. You may use your own VPN infrastructure for this.

# 6 Virtual Machine appliance description

## 6.1 Virtual Machine Server and capacity

The Atea build is delivered as a single virtual machine in an OVF format for you to download. We generally use VMWare version 8 intended for ESXi 5.0 or later.

We recommend that you select to the OVA option, which is a single archive file usually around 6GB in size. This makes it easy for you to import the archive into your VMWare environment.

The virtual machine specifications to run the Atea TSP build are:

Item	Virtual
O/S Support	64-bit O/S
Processor	4 virtual CPUs
RAM	8 GB
Disk	150 GB* Resilient data store recommended

\* Full reporting/accounting requires 2.5GB of storage space per 1 Million calls.

If you have a very large telephone system, you may need more disk capacity and a different edition of database. You can calculate the disk requirements using 1 million calls requires 2.5GB of disk. Most organisations like to have about 13 months of call data within database for reports.

## 6.2 Operating system and middleware

Atea supplies and maintains the O/S, middleware and applications.

Component	Value
O/S	Oracle Linux 7 (64bit)
Database	Oracle 11g XE (11GB max storage *)
Middleware	Oracle Application Express 5
Java	Oracle JRE8
Application Container	Apache Tomcat 8

\* Full reporting/accounting requires 2.5GB of storage space per 1 Million calls. If you want a database approaching 11GB or more, we'll need to use a different edition of the database. The alternative is Oracle Standard two.

## 6.3 Resilience and service continuity

The appliance is supplied as a single device. We normally configure this without high availability, though you may configure the underlying virtual infrastructure can with resilience.

## 6.4 Security

Your Atea appliance is supplied pre-configured with good practice security settings. We'll adjust this during normal maintenance releases whilst the software is under support.

You may install additional anti-virus software; however, we recommend that you disable this for the database components because of the load it puts on the server.

## 6.5 Backups of server and databases

The system makes regular backups of the database and application and critical operating system folders. By default, these are stored in a folder hierarchy on the server itself. However, it is good practise to move these backups to a remote destination to ensure that they are retained should the server fail. The ATEA TSP can automatically transfer the backup files as they are made, to a remote destination, using sFTP. Alternatively, you can install your own backup agent on the ATEA server.

The items to backup are:

1. VM server – you can back this up using suitable VM tools (such as cloning) or using other third party solutions. A server backup will help if the disk or database becomes corrupted (which may happen if the server is not shut down gracefully).

2. Application specific settings, data and Oracle database. The daily backup routine runs at 11pm and automatically saves these items to a folder on the server, overwriting the oldest files. These items are:

- Linux configuration (7 days kept)
- Atea applications (7 days kept)
- Atea application properties (7 days kept)
- Oracle database (2 days kept)

You may copy these files to a network location using sFTP or simply rely on your server backup. Check the website How-to articles for instructions on backing up the files.

### Restoring the system

The general steps to restore a system are:

1. Restore the VM server appliance using your backup.
2. If necessary, retrieve the latest application settings, data and database, to update the server. For assistance on what to restore, contact Atea Support.

This table contains the details of the TSP backup location.

Attribute	Value
TSP backup location	/etc/atea/backups/

## 6.6 Service and port monitoring

We recommend you monitor these items:

Service Name	Service Port
Oracle	1521
Tomcat Web Server	8088

## 6.7 Application URLs

Here's the main URL details.

Application	URL	Description
VMS (call reports)	https://[tsp]/apex/f?p=VMS7	Run the VMS reports

Application	URL	Description
VMS administration	https://[tsp]/apex/f?p=VMS7_ADMIN	Manage gateways, gateway groups and call rates
Local authentication admin	https://[tsp]/apex/f?p=LOCAL_AUTH_ADMIN	Manage local user accounts (if not using LDAP)

## 6.8 Directory and file locations

Description	Directory
CDR sFTP	/home/cdr/cdr_in/


## 6.9 Details for Atea to create the Virtual Machine appliance

We'll need the network details for the virtual machines to communicate.

Please fill out this form online at:

<https://www.ateasystems.com/virtual-server-config/>

ateasystems.com/virtual-server-config


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Customer Company Name *	Customer Email *
<input type="text"/>	<input type="text" value="(to receive download links)"/>
IP Address*	Hostname *
<input type="text"/>	<input type="text"/>
Subnet Mask *	DefaultGateway *
<input type="text"/>	<input type="text"/>
DNS Server IP *	DNS Domain *
<input type="text"/>	<input type="text"/>
NTP Server IP *	Linux Time Zone *
<input type="text"/>	<input type="text"/>
SMTP Server IP *	VMWare Version *
<input type="text"/>	<input type="text" value="(i.e. ESXi 5.5)"/>
CUCM Server IP *	CUCM Hostname *
<input type="text"/>	<input type="text"/>
Export Format *	CUCM Version *
<input type="text" value="-- Please Select --"/>	<input type="text" value="-- Please Select --"/>

Submit

## 7 Licensing considerations

### Server licensing

The server uses open source licensing including Oracle Linux.

### Database licensing

Oracle 11g Express Edition is included with the VMS. As an alternative, we can use Oracle 11g standard one or 12c standard two, using your own license or one that we provide. Also, the system can be configured to use a customer Oracle instance provided APEX is installed.

### CUCM licensing

No additional licensing is required for the CUCM.

## 8 Dependencies and Restrictions

### 8.1 Supported browsers

The Atea VMS reports are displayed in a web browser. For common browsers, the minimum versions are:

- Google Chrome 1+
- Microsoft Internet Explorer 11, Microsoft Edge
- Mozilla Firefox 3.0+
- Apple Safari 3+

## 9 CUCM configuration

### 9.1 CUCM Users

VMS queries the CUCM database to retrieve system configuration information, including the user directory and the relationships between DNSs, devices, device profiles and users. To do this, the VMS must be configured with the details of a CUCM Application User that has been granted the “Standard AXL API Access” role. Setting this up is explained in the VMS7 Administration Guide.

### 9.2 CDR delivery

Use these settings to ensure the CDR's are delivered to the TSP. You'll need to test these when you set up the sFTP connection.

Item	Value
CDR Enabled Flag	True (set this on every server where the CallManager service is enabled)
Call Diagnostics Enabled	Enabled
Billing Application Server – IP-address	tba (Atea TSP)
Billing Application Server – Protocol	sFTP
Billing Application Server – Username	cdr
Billing Application Server – Directory	/home/cdr/cdr_in/

## 10 Design checklist

Here is a check list of things to consider in your VMS design.

Design items	
<b>User roles and information</b> <ul style="list-style-type: none"> <li>List of users to access reports or AD groups created</li> <li>Department information for each user in either AD or CUCM</li> <li>Department information is consistent</li> </ul>	<b>VMS settings</b> <ul style="list-style-type: none"> <li>Call rating is defined and provided to Atea for initial installation</li> <li>Gateways to be processed are defined</li> <li>Gateway groups are defined</li> <li>Locations are defined (if being used)</li> </ul>
<b>VMs appliance and networking</b> <ul style="list-style-type: none"> <li>VM resources reserved including storage and IP addresses</li> <li>Virtual Server configuration form completed</li> <li>Call record retention defined (default is 13 months)</li> <li>Backup and alerting for appliance</li> <li>SMTP relay for emailed alerts and reports</li> <li>Remote access for Atea support</li> <li>Network ports and protocols enabled</li> <li>User browser access to VMS (https)</li> </ul>	<b>CUCM settings</b> <ul style="list-style-type: none"> <li>AXL account provided</li> <li>CDR delivery enabled on CUCMs</li> <li>CDR and CMR delivery configured via sFTP to VMS (TSP server)</li> </ul>

## 11 Terms and definitions

Term	Description
<b>VMS</b>	Voice Management System application. Used to provide business level reporting on the Cisco telephony system.
<b>TSP</b>	Telephony Services Platform, the name for the Atea application environment and server
<b>AXL</b>	A Cisco API that allows an application to read (from a Subscriber node) or read and write (from / to the Publisher node)
<b>AD</b>	Microsoft's Active Directory
<b>CUCM</b>	Cisco Unified Communications Manager
<b>PSTN</b>	Public Services Telephone Network, used for external calls