

Avaya Proactive Outreach Manager Overview and Specification

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Chapter 1: Introduction

Purpose

This document describes tested product characteristics and capabilities of Avaya Proactive Outreach Manager (POM), including product overview and feature descriptions, interoperability, performance specifications, security requirements, and licensing requirements.

Intended Audience

This document is intended for anyone who wants to gain a high-level understanding of the product features, functionality, capacities, and limitations within the context of solutions and verified reference configurations.

Issue	Date	Summary of changes
1.0	February 2016	POM 3.0.3 GA
1.1	May 2016	Updates to the following sections for 3.0.3 Patch 2:
		Browser compatibility
		Database server
		VMware recommendations
		 POM server configuration options
		Third-party connectivity
1.2	May 2016	Added Appendix to include performance test observations.
1.3	August 2016	Added support for Avaya Aura [®] Session Border Controller.

Change History

Warranty

Avaya Inc. provides a 90-day limited warranty on Proactive Outreach Manager. Refer to your sales agreement or other applicable documentation to establish the terms of the limited warranty. In addition, Avaya's standard warranty language as well as details regarding support for Proactive Outreach Manager, while under warranty, is available on the support Web site at http://www.avaya.com/support.

Chapter 2: Avaya Proactive Outreach Manager overview

Avaya Proactive Outreach Manager (POM) is a managed application of Avaya Aura[®] Experience Portal, linking the capabilities within the platform more closely with the management infrastructure and services. POM provides a solution for unified, outbound capability to communicate through different channels of interaction such as Short Message Service (SMS), or email, or traditional voice and video.

POM is an application for interactive outbound voice, SMS, and email notifications.

POM provides a prepackaged application that focuses on quicker deployments, shorter time to market, and lower costs.

POM integrates with Avaya Aura[®] Contact Center and Avaya Aura[®] Call Center Elite to offer agent functionality such as agent blending, pacing, callbacks, conference, and transfer.

POM provides the functionality to develop and design a call flow with the help of Avaya Aura[®] Orchestration Designer.

Related links

New in this release on page 9

New in this release

New features

- Contact Import Improvements: The contact import speed has been optimized with the intent to improvise the speed by at least 30%.
- Edit Database Based Datasource: User is able to edit the SQL query for database type of data source. The edit data source information page has the edit option.
- Serial dialing: Order of dialing the records maintained.
- Display Temporary Restricted Attempts and Call Waiting: The real time monitor will display the various counts in case of temporary restricted attempts.
- Dynamic ECR: This enhancement provides additional control over the running campaign job to an administrator, without the need to pause/resume the campaign.
- Stop/Stop All Jobs: This enhancement provides additional control to the stop job design for efficient agent utilization.

- Strategy locking: The user will be restricted to modify the number of handlers and pacing type of the strategy.
- New operators in Campaign Creation Wizard: New operators are introduced for record selection in campaign creation wizard.
- Secure AACC connection: The user will get an option to perform secure connection via https to the CCMA web service
- Classification of agent desktop messages: This feature provides the classification of messages sent by Agent API to the desktop(s).
- Optimized agent login: The AGTLogon method will have dedicated thread for agent login so that main thread can continue processing other agent commands.

For more information on the new features, refer *Proactive Outreach Manager 3.0.3 Release Notes* on the support site at <u>https://support.avaya.com</u>.

Related links

Avaya Proactive Outreach Manager overview on page 9

Chapter 3: POM deployment

POM server configuration options

You can install POM software either on a single system or on multiple systems, based on your outbound notification requirements.

You can use a single POM server for smaller campaigns, and multiple POM servers for larger campaigns. For a single POM server configuration, you can use a separate server for failover.

Single server configuration

The configuration includes a single system running the Experience Portal Manager (EPM), Media Processing Platform (MPP), POM software with the database, and the application server. You can use local Postgres database only where you install EPM, MPP, and POM server on a single system.

🕒 Tip:

In production environment, do not install POM database schema on local PostgreSQL.



Figure 1: Single POM server configuration

🕒 Tip:

Install the database server and the application server on a separate system for better performance. If you install the database server on one system, and EPM, MPP, POM server on another system, you can use an external Postgres database, external Oracle database, or external MS-SQL Server 2012 database for the systems.

Multiple POM server configuration

The multiple server configuration includes one or more POM servers, installed on the primary EPM and auxiliary EPM. The EPMS plug-in resides only on the primary EPM.

Install the EPMS plug-in and POM server on the primary EPM system and the desired number of POM servers on the auxiliary EPM systems.

If you have installed POM as a multiple server configuration and have more than one POM server, then one of the online POM servers controls the failover and load balancing.



Figure 2: Multiple POM server configuration

Integration with Avaya Aura®Call Center Elite

The following image depicts the integration of Avaya Aura[®]Call Center Elite with POM:



1. Only AAEP 7.0 is supported

2. CMS is required only for blending and skill based pacing.(RT Socket license is mandatory for both)

ACR is for call recording purposes only.

3. SIP connection from AAEP is mandatory for live agent campaigns.

4. Versions used during verification

CM - 6.1, SM - 6.1 AES - 6.1

Figure 3: Integration with Call Center Elite

POM integrates with Avaya Aura[®]Call Center Elite for agent-based campaigns. The MPP is used for standard call classification and outbound dialing. POM provides APIs to integrate with third party agent desktops. In POM 3.x, you can configure only one Automatic Call Distributor (ACD). For more information about API's, see *Developer Guide for Proactive Outreach Manager*.

Integration with Avaya Aura® Contact Center

The following image depicts the integration of Avaya Aura® Contact Center with POM:



Figure 4: Integration with Avaya Aura[®] Contact Center

POM integrates with Avaya Aura[®] Contact Center (AACC) to create and run agent-based campaigns.

You can use MPP for standard call classification and outbound dialing. POM connects with the Avaya Aura[®]Agent Desktop (AAAD) to manage the agents for both inbound and outbound calls.

😵 Note:

You can configure a single AACC server to communicate with a single POM setup having 1 primary POM server and multiple aux POM servers. The AACC server cannot communicate simultaneously with such 2 different POM setups.

POM server overview

The POM server consists of core POM components required to execute campaigns and communicate with various POM Web services. You can install the POM server either on primary EPM or the auxiliary EPM. If you install the POM server on more than one system, the POM server supports high availability and failover capabilities.

The core POM components are:

Campaign Director

Campaign Director is a Linux service responsible for triggering campaigns and data imports at scheduled date and time. Campaign Director is also responsible for pausing and resuming campaigns based on user action and terminating campaigns if their finish criteria is specified. If you install POM as a multiple server configuration, then only one campaign director is in the active state and others are in dormant state. For a multiple server configuration, the campaign director is responsible for assigning the contacts to be processed for any campaign across POM servers. Campaign Director is also responsible for redistribution of load in case of failures.

Campaign Manager

Campaign Manager is a Linux service and is responsible for parsing a campaign strategy, making voice calls, and sending SMS or email messages. Campaign Manager interfaces with one or more EPM servers for making outbound calls.

If you configure multiple EPM servers, the Campaign Manager uses all the servers in a synchronized manner, using all media resources available for load balancing and failover.

If you install POM as a multiple server configuration, the Campaign Manager service runs on all POM servers. When you run a campaign, each Campaign Manager processes the contacts allocated to the campaign by the Campaign Director.

POM Web services

The system installs web services as a part of POM server and accesses the web services from the external applications. POM Pluggable Data Connector (PDC) uses web services to interface with POM. You can use the Web services to access various contact attributes to play personalized prompts or make certain decisions in the application flow.

Agent Manager

POM Agent Manager (PAM) is a Linux service and is the core module to manage and run campaigns. You can either have agent-based campaigns or agent-less (notification) skill-based campaigns. PAM is responsible for distributing licenses to all voice-based campaigns. The high-level functions of PAM include:

- Manages agent allocation and state for campaigns.
- Manage agents in a blended job. Only CC Elite configuration supports this module. For more information about different configurations, see <u>POM server configuration options</u> on page 11.
- Update the POM database with current agent related information for reporting and HA related functionality.
- Distribute the preview and predictive agent licenses among running agent-based campaigns and distributing outbound ports to voice notification campaigns.
- Support High Availability in case of system failures.
- Support real-time commands from POM Monitor such as minimum agents, priority, or agentbased commands such as Forced Logoff.

Nailer CCXML application

To speed-up the process of connecting to customer call with agents, POM keeps the agent on a continuous call. This continuous call is known as nailing. This application takes care of the agent call

control flow. An available agent is nailed at the beginning of the call session when the agent gets attached to a job.

POM helps to enhance the agent performance by delaying the un-nailing of an agent. When the system detaches the agent from a job, the system does not terminate the agent nailing. The next job also uses the same nailing session. In some cases, as a result of agent optimization, the system can nail the agent by a different application assigned to the job.

POM does not support multiline appearance on agent phones and does not check the agent phone status for off-hook/on-hook before launching the nail-up call.

POM does not support hold on nailed calls. It does not check the agent phone status for hold/unhold during the nail-up. The agent must ensure that the nailed call is not put on hold to avoid nuisance, silent, or abandoned calls to customers.

Driver CCXML application

This application takes care of the customer call control flow.

Agent Scripts

When an agent gets a call, an agent script is shown to the agent on his desktop, which contains the script that the agent speaks to the customer.

The agent script is displayed on agent desktop to help the agent with the customer call. The agent script can be either Native or URL based. You can create, delete, or modify the Native scripts using a built-in editor. To use agent scripts, you must associate the agent script with a campaign strategy for agent-based campaigns. For more information about agent scripts, see *Using Proactive Outreach Manager*.

Active MQ

Active MQ is a Linux service responsible for stopping, pausing, resuming the campaign, and import jobs. You can change the runtime parameters of campaign jobs and publish the contact attempt information using Active MQ.

Database server

The database is a very critical component of the POM architecture. POM uses database extensively to store information such as contact records, campaign templates, schedules, and campaign data.

POM supports Oracle and PostgreSQL, and MS-SQLServer databases.

😵 Note:

If you install POM database schema on a local or external database, POM does not refer to the contents of the local or external database, or administration of the system. The administration of the system and contents of the database is the responsibility of the customer.

You can install the POM database either on a local server or on an external database server. Avaya Aura[®] Experience Portal supports local PostgreSQL database. You can create a POM schema in

the Avaya Aura[®] Experience Portal database, or you can create a POM schema on the local PostgreSQL database server.

🕒 Tip:

In production environment, do not install POM database schema on local PostgreSQL.

To create the POM schema on an Oracle or MS-SQL Server 2012 database, you must install the Oracle or MS-SQL Server 2012 database on a external server.

POM supports Oracle 11g and higher versions, MS-SQLSever 2012, and PostgreSQL 9.2 and higher versions.

😵 Note:

If you do not create the POM schema in the Avaya Aura[®] Experience Portal database, ensure that you backup the database manually.

POM EPMS plug-in

POM integrates with the EPM to provide common administration and management tasks like Single Sign On, user management, logs, alarms and license management. You can install POM EPMS plug-in only on the primary EPM.

When you install the EPMS plug-in, the plug-in registers POM as a managed application with Avaya Aura[®] Experience Portal, deploys the POM Web application on the Tomcat server and initializes POM related configurations.

Customizations

You can customize certain features in POM to suit your requirements. POM provides the flexibility to run campaigns, customize the post processing and the monitoring of the campaigns.

After you create and run a campaign, you can choose to export the records after the completion of the campaign, and store in a .csv file. You can change the location where you want to store the .csv file. You can use this file to export all the successful attempts of the given campaign after the campaign job is over. You can select the columns you want to export along with filtering the number of records using the completion code. For example, you can export only those contacts where the completion code is Answer Human.

You can write a custom java class to process all the attempts after the campaign terminates. For example, you can use this to export contacts with customized details like, campaign name, campaign ID, phone number, e-mail address after the campaign job is over.

You can also customize the action you want the POM system to perform as defined in the campaign strategy. You can run a campaign using a custom implementation, and not use the standard call,

SMS, or e-mail action. The custom action uses the Application node and you need to specify the custom application class or file name under the Application node when you create a campaign strategy.

You can create your own desktop for agent-based campaigns using the API's that POM provides. For more information about agent API's, see *Developer Guide for Proactive Outreach Manager*.

Chapter 4: Feature description

Campaign management

A campaign delivers a specific message to all customers in the database through selected channels such as e-mail, SMS, and voice.

POM provides a Web-based wizard to create campaigns. A campaign typically has a name, a campaign strategy, and one or more contact lists. You can have either a finite campaign or an infinite campaign. You can set filter criteria on the contact lists. If you specify a filter criterion, POM applies the criterion at the beginning of a campaign and selects only those customer records that meet the specified criterion. You can define and associate one or more custom completion codes with a campaign when you need some user input.

A campaign can end naturally after processing all contacts or you can specify following criteria to end the campaign:

- Goal-based campaign: A goal-based campaign terminates after receiving an expected number of responses from customers.
- Time-based campaign: A time-based campaign terminates after running for a specific time duration. For example, you can terminate a campaign after 12 hours.
- Completion code-based campaign: A completion code-based campaign terminates after achieving a specific completion code condition. For example, you can terminate a blood donation campaign after you receive 50 accepted responses.

After you create a campaign, you can schedule or run the campaign immediately. You can customize the campaign to suit your requirements. You can schedule or run the campaign you create as a single instance or multiple instances with a daily, weekly, or monthly frequency. For example, a birthday campaign can run daily, and a credit card notification campaign can run every Monday.

In addition to creating voice, SMS, e-mail campaigns, you can also create 2 way SMS and e-mail campaigns. These campaigns help you to send and receive responses and you can then take appropriate actions based on different conditions. You must make appropriate changes or create campaign strategies in specific manner to use 2 way SMS and e-mail campaigns. POM uses Web services to enable the 2 way communication. POM provides stock applications for both SMS and e-mail. The applications receive SMS and e-mail responses and update the attribute value and completion code for the specific POM contact. For more information about 2 way SMS and e-mail campaigns, see *Using Proactive Outreach Manager*.

Contact list management

Campaigns need phone numbers for making voice calls and sending SMSs and email addresses for sending email messages. A contact list is a collection of customer records. You can set up any number of contact lists and associate one or more contact lists with a campaign. You can also use a single contact list in multiple campaigns. In a multitenant environment, you can associate a contact list with one or more tenants. Typically this customer data resides outside POM in a contact management system, and based on your campaign requirements, you must import relevant customer records into POM at regular time intervals.

You can set up any number of contact lists and define any number of attributes. Using POM, you can import customer records into a contact list from various external data sources such as flat files, external database and use various Web service methods to create, read, and update customer records. You can export all customer records into a comma-separated values (.csv) file.

You can add contacts in 2 ways; either through import or through web services. Contacts added to the contact list via either of the processes are stored in the *pim_contacts* and required associated tables. The *pim_contacts* table stores the contact list associated with a campaign. The records available in the *pim_contacts* table are filtered and sorted, and the records matching the configured criteria are inserted in the *pim_job_contacts* table. The system picks up the records for dialing in a batch from the *pim_job_contacts* table. The system adds the dialed or attempted records to the *pim_job_attempts* table.

You can use the SaveContactToList, AddContactListToJob, and AddContactFromListToJob web services in combination to add new contacts to a running campaign. To add a new contact to job, use SaveContactToList followed by AddContactFromListToJob web service. To add a new contact list to the job which must be considered for dialing, you must add the contact list explicitly to the job using the AddContactListToJob web service. For more information on the web services, see *Proactive Outreach Manager Developer Guide*.

😵 Note:

Any new contacts added to the contact list are considered for filtering, sorting, and dialing only if the campaign state is either "running and filter in progress" or "running and queued". The campaign state is "filter in progress" only once at the beginning of the campaign irrespective of whether you enable dynamic selection. The campaign state does not change to "filter in progress" even if you pause and resume the campaign.

If you want to add new contacts or contact list to any campaign which has started dialing, you must explicitly add the contacts to the job, so that the newly added contacts get stored in the *pim_job_contacts* table. While adding a contact list to a job, you can set the filtering parameter to True or False. The system accordingly applies filtering and sorting criteria configured in campaign creation wizard to the newly added contact list.

😵 Note:

The newly added contacts are not re-sorted, or compared against the pending contacts in the list. All filtered contacts from the contact lists are made available in the *pim_job_contacts* table from where they are picked for dialing as per the campaign batch size.

Dynamic selection

Dynamic selection feature in POM provides facility to add new records such that newly added records are considered for dialing in the immediate next batch. Based on the configurations, these newly added records are considered for dialing in the immediate next batch.

😵 Note:

POM does not sort the set of newly added and the remaining contacts in the list even if you enable dynamic selection.

If you do not enable dynamic selection, the system filters the records only once, and moves all contacts matching the filter criteria to the *pim_job_contacts* table at in one go.

If you enable dynamic selection, the system filters the records before forming every next batch to be dialed. The system does not move all contacts matching the filter criteria to the *pim_job_contacts* table in one go. Instead the system fetches the number of contacts matching the campaign batch size and adds them to the *pim_job_contacts* table.

If you enable dynamic selection, and the campaign and the contact imports are running in parallel, the new records added while the job state is "filter in progress" and the records matching the filter criteria are considered for dialing.

😵 Note:

The system does not add the newly added contacts matching the filter criteria to the same batch. It adds those records in the next batches as per the sorting order of the records.

If you enable dynamic selection, and have specified a sort criteria, the newly added contacts will be considered while forming the next batch, where they are first filtered/sorted within the new set according to the sort criteria mentioned in the Campaign Creation Wizard and then dialed.

If you add new contacts AddContactsFromListToJob and AddContactListToJob web services, the system adds the newly added contacts to the dialing queue based on the priority set in the web service. If set the priority of the newly added records as TOP, and you have enabled dynamic selection, then the new contacts will be considered almost immediately in the next batch.

The table depicts the change in dialing if you enable or disable dynamic selection. For more information on the priority behavior, see the *AddContactFromListToJob* method in the *Proactive Outreach Manager Developer Guide*.

	Jobs with Dynamic Selection	Jobs with Normal Selection
How to turn on dynamic selection	Using campaign Creation Wizard (CCW), dynamic selection option is enabled	In CCW, dynamic selection option is NOT enabled
When contacts are filtered into the <i>pim_job_cont</i> <i>act</i> table?	Periodically whenever campaign manager asks for next batch	Only once at the beginning of the job

Table continues...

	Jobs with Dynamic Selection	Jobs with Normal Selection
What if I add a new contact list to the job using web service without specifying priority parameter	 Entire contact list is added at the end of the current batch in the order of the system_contact_id. Here order of dialing will be as follows: 1. First the contacts from the already locked batch will be dialed. 2. Then the newly added contacts will be dialed and then campaign manager will ask for the next batch. 3. Next batch will be retrieved for dialing. 	 Entire contact list is added at the end of the "all the filtered contacts" in the order of the system_contact_id. Thee order of dialing is as follows: 1. First the contacts from the already locked batch will be dialed. 2. Then the top priority contacts will be selected from the combined set of remaining contacts and newly added contacts.
What if I add a new contact list to the job using web service with priority as BOTTOM	 Entire contact list is added at the end of the current batch in the order of the system_contact_id. Here order of dialing will be as follows: 1. First the contacts from the already locked batch will be dialed. 2. Then the newly added contacts will be dialed and then campaign manager will ask for the next batch. 3. Next batch will be retrieved for dialing. 	 Entire contact list is added at the end of the "all the filtered contacts" in the order of the system_contact_id. Here order of dialing will be as follows: 1. First the contacts from the already locked batch will be dialed. 2. Then the top priority contacts will be selected from the combined set of remaining contacts and newly added contacts. Note: As newly added contacts have BOTTOM priority they will be dialed in the last batches after the LOW priority contacts.
What if I add a new contact list to the job using web service with priority as LOW	 Entire contact list is added at the end of the current batch in the order of the system_contact_id. Here order of dialing will be as follows: 1. First the contacts from the already locked batch will be dialed. 2. Then the newly added contacts will be dialed 	 Entire contact list is added at the end of the "all the filtered contacts" in the order of the system_contact_id. The order of dialing is as follows: 1. First the contacts from the already locked batch will be dialed. 2. Then the top priority contacts will be selected from the combined set of remaining contacts and newly added contacts.

Table continues...

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Table continues...

	Jobs with Dynamic Selection	Jobs with Normal Selection
priority as TOP	 order of dialing will be as follows: 1. First the contacts from the already locked batch will be dialed. 2. Then the newly added contacts will be dialed and then campaign manager will ask for the next batch. 3. Next batch will be retrieved for dialing. 	 2. Then the top priority contacts will be selected from the combined set of remaining contacts and newly added contacts. Note: As newly added contacts have TOP priority they will be dialed first.

Serial dialing

POM Campaign creation wizard provides user with a new option "Dial selected records serially as per sort order" in "Miscellaneous" section of "Processing Parameters (optional)" page. User can use this option while creating campaign to enable serial dialing or normal dialing. When this option is enabled, POM will ensure that the contacts are dialed as per the sort order specified in the campaign creation wizard by allocating the job to one campaign manager. When this option is disabled, POM will not maintain the dialing order since the job is distributed across multiple campaign managers. The default value of this option is true.

If you have set the value to less than 100, then while creating new campaigns the serial dialing will be turned off by default as the minimum batch size required for serial dialing is 100.

Note:

For better performance with serial dialing, the minimum batch size should be 100. If you are upgrading from POM 3.0.1 to POM 3.0.3, a script setSerialDialingEnable.sh needs to be executed post installation. This script will find the campaigns having batch size 1, set the campaign batch size above 100, and will also enable the Dial selected records serially as per sort order option.

If the "Dial selected records serially as per sort order" flag is enabled for a job, then the campaign director processes the job and searches for the best campaign manager which is least busy and assigns the job to that campaign manager. The campaign manager then picks up a batch of contacts from the job for further processing.

To identify the least busy campaign manager, POM takes into account the number of worker threads in campaign manager. This information is stored in the database.

- For agent-based campaigns, 1 worker thread is associated with 5 agents.
- For notification campaigns, 1 worker thread is associated with 20 ports.
- For SMS and email campaigns, 1 worker thread is associated with each campaign.

The campaign manager periodically updates the numbers of threads related information in the database across all jobs handled. If 2 or more campaign managers have lowest threads, then POM considers the number of jobs allocated to the campaign manager to identify the least busy campaign

manager. If the number of running jobs is also same, POM considers the first identified campaign manager with lowest campaign manager ID as the least busy campaign manager.

In serial dialing, if a campaign manager that is handling the job becomes nonfunctional, then the campaign director moves the job to next best campaign manager available.

If the serial dialing is disabled, the campaign director creates a new job for each campaign manager, thus distributing the jobs across all campaign manager. In case a job is paused and resumed, the campaign director will identify the least busy campaign manager and allocate the job to that campaign manager.

😵 Note:

In case of a single POM setup, the campaign director creates a new job for the campaign manager irrespective of whether the serial dialing is enabled or disabled.

If you have a campaign strategy with multiple handlers and serial dialing is enabled, the first attempt of the contact will be maintained in serial order. For example, following is a strategy with multiple handlers:

```
Handler<initial>
Call <action node>
Result <CompletionCode=Sales Done>
Next state = SendSMS
Handler<SendSMS>
SMS <action node>
Result <CompletionCode=All>
Next state = Done
```

All contacts dialed through the initial handler are in serial order for the first attempt being made to the contact. Once the contact moves to the next handler, the serial order cannot be guaranteed as the call completion time might vary or there might be wait conditions for some completion codes.

The selector node distributes the contacts across handlers. If you have enabled serial dialing, the first attempt of the contact will be maintained in serial order. For example, following is strategy with handlers:

```
Handler<initial>
Selector <action node>
Conditions <attribute=CustomerType>
Condition=Gold
NextState="MakeCall"
Condition=Silver
NextState="SendSMS"
Handler<MakeCall>
Call <action node>
Result <CompletionCode=Sales Done>
Next state = SendSMS
Handler<SendSMS>
SMS <action node>
Result <CompletionCode=All>
Next state = Done
```

For all contacts with the state initial, POM does not attempt to dial those records as the selector is updating the next state for the contacts based on the assigned conditions. The campaign manager then picks the next contacts with state MakeCall and Send SMS in parallel and starts dialing. The campaign manager ensures the first attempt of the contact is in serial order for MakeCall or Send SMS.

If you have multi-action nodes within a handler and you have enabled with pacing, POM dials the contacts based on the speed of the slowest action defined in the strategy. The campaign manager

processes the contact in sequence for all actions defined before moving to next contact. Thus calls will be paced based on the slowest action defined. If you want to ensure correct processing, disable the serial dialing flag.

For example, you have a contact strategy to call and send SMS to all the contacts. The contact strategy will be as follows:

```
Handler<initial>
Call <action node>
Result <CompletionCode=All>
Next state = Done
SMS <action node>
Pacing = TimeBased
Speed= 5 per minute
Result <CompletionCode=All>
Next state = Done
```

The net dialing speed of a campaign job which is using above strategy will be around 5 SMSs per minute and 5 Calls per minute though there is no pacing defined for the call node. This is because both the call node and SMS node will be served by the same pool of worker threads for that handler. At a time only one worker thread from the pool is allowed to work on a contact. When a worker thread makes first call attempt, it will be blocked on SMS attempt. SMS will not be sent till the allowed time interval between 2 SMSs is elapsed, which is 12 seconds in above example. Then another thread is allowed to make the next call, which means that calls will also be made after every 12 seconds. The net dialing speed achieved will be around 5 SMSs per minute and 5 Calls per minute.

Caveats for serial dialing:

Following are some use cases for which contact will not be dialed in order:

- Temporary Restrictions and Guard time: The contacts which fall under temporary restrictions and guard time will be dialed only when the dialing conditions are met. Thus report will show some contacts dialed out of order. Such contacts will have their attempt type set to Out of temp restrictions.
- Callbacks: If there are any callbacks scheduled, POM will give them highest priority and will be dialed immediately thus report will show some contacts dialed out of order. Such contacts will have their attempt type set to callback.
- High/Top priority contact dialing: High/Top priority contacts added through Web service will be dialed immediately after processing of one or two contacts which are locked for dialing. Such contacts will appear out of order in report and will have their attempt type set to High Priority Contacts.
- Media Server failure while dialing contact: POM leverages experience portal Web service for initiating dialing. If for some reason request fails, then POM re-attempts the contact after the existing batch is completed. Such contacts will appear out of order and will not have any attempt type defined in report as the first attempt itself failed.
- Retry: If there are any retries for any contact, POM will dial such contacts immediately after processing one or two records which are locked for dialing. Such contacts will appear out of order and will have their attempt type set to Retry.

Contact attribute management

Attributes are properties of customer data. POM supports various attributes which are common and typically required for processing the customer data. You can filter the customer data based on the attributes.

Based on your campaign needs, you might need custom attributes such as Amount Due, Due Date, and BloodType. Using POM you can set up custom attributes, and import data to these attributes. A typical custom attribute has a name, data type, read only flag for agents, masked for agents flag, and privacy flag.

If you enable the read only for agents flag, the agent is unable to edit the values of the attribute through the agent desktop. If you enable the masked for agents flag, the agent is unable to see the attribute value through the agent desktop. For example, the system displays the passwords as ******. The privacy flag helps you to define the visibility of an attribute in a multitenancy setup. For more details about multitenancy, see <u>Multitenancy</u> on page 35.

Contact data sources

With contact data sources, you can define source from which you can import customer records in to a contact list. You can define three types of data sources, file based, database based, and custom. With the file-based data source, you can import customer records from a .csv file into a contact list. The .csv file can either be on a file system of POM server or the File Transfer Protocol (FTP) server. With the database-based data source, you can import customer records from an external database. You can run the data source to import data. You can also define recurring schedules to import data at a fixed interval from an external file or a database.

POM 3.x supports new features for the phone numbers and depending on the settings you configure, saves the phone number in the database and applies the specified phone formats, reject patterns or dialing rules. You can specify when POM can place calls. For example if you want POM to place calls only during specific timings or days, you can specify a guard time with the criteria.

For more information about phone formats, reject patterns, dialing rules, and guard times, see *Using Proactive Outreach Manager*.

Media channel management

POM uses various notification channels to run Voice/video, SMS, and e-mail campaigns.

SMS channel

POM leverages capabilities provided by Avaya Aura[®] Experience Portal to send/receive SMSs in a campaign. Use this notification channel to send an SMS to the selected customers using the Short Message Peer-to-Peer Protocol (SMPP) 3.4. If the length of the SMS exceeds 165 characters, POM sends the message in the form of multiple SMSs.

Email channel

POM leverages capabilities provided by Avaya Aura[®] Experience Portal to send/receive e-mail messages in a campaign Use this notification channel to send email messages using the Simple Mail Transfer Protocol (SMTP). SMTP supports only text in emails and multiple attachments.

Voice and video channel

You can assign Avaya Aura[®] Orchestration Designer applications, as a part of the campaign strategy. These applications will be played when call launched from a call campaign is answered by a customer. You can use the POM-supplied applications AvayaPOMNotifier and AvayaPOMAgent, to send simple notifications or to transfer a call to an agent. You can use a voice channel to run either an agent-based campaign, or an automated notification campaign.

Campaign strategy management

Use campaign strategies to define the process of interacting with customer during a campaign using various channels. You can select the following aspects of interaction in the strategy:

- Notification channel: voice, SMS, email, or custom.
- Contact address used for customer interaction
- · Rules for contacting the customer, such as timing restrictions and number of retries
- · Applications to be used
- · Personalized notifications texts

Campaign restrictions

You can define restrictions which are applicable to all campaigns globally on the campaign restrictions page You can override the campaign restrictions at the individual campaign level while defining the campaign strategies. For example, if you have set a campaign restriction to not call a customer registered in the Do Not Call (DNC) list, you can override the restriction for an individual campaign.

Campaign pacing

Use pacing to control the distribution of number of calls, SMSs, or emails you want the POM system to make or send depending upon availability of the resource like ports, licenses and agents.POM supports time-based and skill-based pacing for call, SMS and email.

POM supports various modes of pacing for agent campaigns such as preview, progressive, and predictive campaign.

Time-based pacing for automated voice campaigns

Use the time-based pacing to control the number of calls the system makes per second, minute, or hour. You can specify the pacing type in the Call node of the campaign strategy.

Time-based pacing for SMS campaigns

Use the time-based pacing for SMS to monitor and control the number of SMS the system sends per second, minute, or hour. You can specify the pacing type in the SMS node of the campaign strategy.

Time-based pacing for email campaigns

Use the time-based pacing for email to monitor and control the number of emails the system sends per second, minute, or hour. You can specify the pacing type in the Mail node of the campaign strategy.

Skill-based pacing for campaigns

You can use skill-based pacing with Call Center Elite or with Avaya Aura [®] Contact Center (AACC). Skills are monitored using Call Management System (CMS) for Call Center Elite.



To use skill-based pacing for campaigns with AACC, configure the skills on AACC. For more information about configuring and creating skills in AACC, see *Avaya Aura*[®] *Contact Center* — *Proactive Outreach Manager Integration* documentation.

The inbound skills on Call Center Elite are monitored and are used to control the rate of outbound calls or SMS or emails. You can use the skill based pacing to control the rate of the outbound calls, SMS, or emails based on certain inbound parameters. The parameters are queue length, expected wait time, average speed of answer, and % answered within service levels. You must map the skills from the CMS to the skills created in POM and then POM accordingly varies the outbound call, SMS, or email flow based on the traffic on the inbound skill.

😵 Note:

To create and run skill based campaigns using Call Center Elite, you must configure RT Socket on the CMS server.

Call pacing for agent-based campaigns

Call pacing methods are used for agent- based campaigns to control the call rate based on the availability of agents. The pacing methods are:

- Predictive Expert Calling Ratio: You can use this method to optimize the use of agents, or manage and change call handling time, or place as many calls as possible during the job. Expert Calling Ratio allows you to change the way POM determines when to place the next call while a job is running.
- Predictive Cruise Control: You can use this method if you want to limit abandoned or nuisance calls while maximizing the agent utilization (AU). Cruise control automatically maintains the service level of outbound dialing during a job and connects the calls to agents within a specified time period. During the job, you do not have to monitor or change the call pacing settings. The algorithm tries to maximize the AU while maintaining the service level. So in some extreme conditions such as low hit rate, the AU drops.
- Progressive: You can use this method to ensure that for each call that POM launches, an agent is available. This method ensures that nuisance calls are minimal, but also reduces the agent

utilization. The pace of the job is slow as the system keeps waiting for an agent. The system does not do over dialing using forecasting as for predictive methods. You can accelerate the pacing by defining the overdial ratio as more than 1. For example, if you set the ratio as 1, POM launches 1 call for each available agent.

• Preview: You can use this method if you want the agent to preview the customer record before dialing. This helps in better customer service.

Custom pacing for all automated voice campaigns

You can use two Web services for custom pacing. SetMaxAttemptsCountForTask and GetActiveJobTaskIdForTask. For more information about the Web services, see *Developer Guide for Proactive Outreach Manager.*

Do Not Call list management

Do Not Call (DNC) lists have the contact information of those customers who opt out from receiving any unwanted calls. With POM, you can import the DNC lists from various service providers to the POM database.

POM does not contact the customers listed in the DNC list for campaigns if DNC is set in the campaign strategy.

Web service management and Pluggable Data Connector nodes

You can gain access to POM features using the VP_POMAgentAPIService Web service methods.

You can use the VP_POMCmpMgmtService Web service for campaign management and custom call pacing.

You can use the Pluggable Data Connector (PDC), a plug-in, to perform POM specific operations using Avaya Aura[®] Orchestration Designer application. For details on the Web services and PDC nodes and methods, see the *Developer's Guide for Proactive Outreach Manager*.

Zone management

POM 3.x supports zones. Zoning is the capacity of partitioning a system into multiple zones. The advantages of zoning are better control and distribution of resources, increased performance and scalability.

😵 Note:

POM supports zoning within the same datacenter and does not support zoning across datacenter or across geographic deployment.

Zone architecture

Zones are extended POM systems. All zones have a common central database. The POM Zone manager is installed on the primary EPM. If you do not create and assign zones, all the resources belong to the default zone.

The different components are:

- Common Campaign Director (CCD): The CCD is responsible for all the common tasks across zones such as scheduling, filtering campaign data, creating historical data, and exporting campaign data. The master campaign director is the CCD.
- Campaign Director (CD): A single CD can handle multiple zones. You can assign multiple zones to campaign director and each zone will have a zone director within the CD. You must manually assign the CD and the agent manager for every zone. You can also have multiple CDs in a local site.
- Campaign Manager (CM): The CM is responsible for executing the campaigns.
- Agent Manager (AM): The AM is responsible for managing outbound agents. Every zone will have one active AM.
- Active MQ: The active MQ is responsible for receiving messages from the user interface and then passing the messages to the current zones through the active CD and AM.

POM elements impacted by zoning

- Campaigns: You can run a single campaign in different zones. While creating campaigns, you can select contact lists from different zones and assign the contact list to the specific campaign.
- Contact lists: You can create contact lists for different zones. While creating the contact lists, you must assign a zone for the contact list. If you do not assign any zone, the contact list belongs to the default zone. You can edit the contact lists to change the zone association.

Note:

You can edit only those contact lists which are not associated with any active data import or active campaign.

- Licenses: You can assign licenses for different zones that you create. The total licenses across zones cannot exceed the total POM licenses. POM distributes the licenses assigned to a zone to different organizations belonging to the same zone. For example, if <zone1> has 100 licenses, and there are 4 organizations belonging to <zone1>, POM distributes the 100 licenses between 4 organizations.
- Configurations: You can assign a CD and an AM to a specific zone using the zone configurations tab. At any point, all the zones must have one CD and one AM allocated.

Integration with Avaya Contact Recorder

Call recording is an integral feature of any outbound offering and is a critical feature to have as POM 3.x supports agent-based campaigns. To meet this requirement POM integrates with Avaya ACR for call recording capabilities.

POM integrates with Avaya ACR using a switch side recording approach and records calls to meet compliance needs and for bulk recordings. While integrating and extending the recording capabilities, Avaya ACR controls the way the calls are recorded. The recordings are driven by Avaya ACR, and POM does not drive the recordings. POM integrates with Avaya ACR with the help of socket-based messages sent from POM to Avaya ACR. The default port used for communication is 7999. Select the Enable recording check box in the Global Configurations when you set up POM. For more information about enabling Avaya Aura[®] Workforce Optimization, see *Using Proactive Outreach Manager*.

About Blending

Blending in POM for voice calls helps you to manage the inbound and outbound capabilities and allow the agents to move between inbound and outbound calling activities. POM uses dedicated outbound agents and a pool of blended inbound-outbound agents such that the blended agents are available to the inbound channel if inbound service levels are not being met.

The inbound mission and outbound mission are mutually exclusive. Agents working on inbound calls cannot take outbound calls at the same time. Agent blending relies on the priority settings and the raising of service level exceptions from queue or skills.

Agents move automatically between the inbound mission and the outbound mission based on business priorities and agent availability. The blender acquires or releases agents based on the traffic on particular inbound skill. When the traffic is low or high as indicated by certain parameters, blender accordingly acquires agents back or releases agents from outbound campaigns. The skill that you configure on the CC Elite configurations page is monitored by the blender for the specific zone.

Based on the inputs received from the RT_Socket package on Call Management System (CMS), the blender acquires the agents from inbound or releases agents to inbound according to the traffic on the inbound skill.

PAM also supports manual blending of an agent. You can select an outbound agent on the POM monitor to send to inbound for specific time. The blender will not acquire the agent for the specified time duration even if the traffic is low.

Based on the agent's zone, the PAM server managing the zone initiates an action on the agent, both for inbound and outbound.

You can perform agent blending using the parameters such as Call Waiting, Average Speed of Answer (ASA), Expected Wait Time (EWT), and Percent Service Level (SL). You cannot change the values that are set for ASA, EWT, and SL. For more information about the parameters, see *Avaya*

Aura[®] Communication Manager documentation. The ASA, EWT, and SL impact the blending in some cases like:

- In case of ASA, the system updates the value only after an inbound agent takes a call and completes the call. So if you have no agents for the inbound skill, the system will not update the ASA value irrespective of the number of calls in a queue for the inbound skill. In this scenario, the blending might not happen as per expectation.
- If you have no agents matching the inbound skills, the EWT might be high. This might impact the blending as the system might move the agents to inbound to handle the wait period.
- You must define acceptable values for service level and service level increments for all the skills on the Call Management System. For more information about Spilt or Skill Call Profile setup, see *Call Management System* documentation.

In cases where POM integrates with Avaya Aura[®] Contact Center (AACC), AACC takes care of blending. POM gets the blended agents from AACC. For more information, see *Avaya Aura[®] Contact Center-Proactive Outreach Manager Integration*.

Blending parameters

For the skill type inbound and parameters **queue length**, **expected wait time** and, **average speed of answer**, the **agent release threshold value** is always greater than the **agent acquire threshold value**. For example, if the **agent acquire threshold value** is 0, then the **agent release threshold value** must be 1 or more. For the parameter % **answered within service levels**, the **agent release threshold value** is less than the **agent acquire threshold value**.

Callback management

POM provides a callback feature to provide an agent opportunity to get in touch with the contact at some later point of time. You can set a callback only after getting the consent of the contact. POM Agent Manager (PAM) allows the agent to set the callback while agent is talking to the contact, or when agent is wrapping up the call. All the callbacks are treated like the preview calls.

😵 Note:

If POM service is stopped when callback is in preview and the contact is not dialed, then once POM service comes and the callback expiry time exceeds, then the contact is not dialed.

POM supports the following 3 callback types:

- Standard
- Campaign
- Agent

Standard callback

A campaign is moved to the callback state if before the callback schedule starts. POM processes all existing contacts of that job. POM also moves or frees all agents attached to that job to other jobs.

When callback schedule starts, agent manager searches for an agent with same skill as of the job in callback state. The agent manager prepares an agent list and assigns the callback to the best agent.

Depending on the job on which you set the callback, the agent manager gives a callback. If the running jobs has no contacts pending, the system moves the callback to a shadow state, and releases all the resources. If the system receives a callback for the shadow job, agent manager retrieves the skill associated with the shadow job , and tries the least priority job having at least one agent associated with the job, and matches the shadow job skill.

PAM prepares a list of all the agent states, but does not consider agents in aux state. The agent manager then detaches an agent and attaches the agent to the shadow job and the delivers the callback to the agent.

Campaign callback

Campaign callback is very similar to standard callback, except that the agent manager prepares the list of running jobs and populates the list to the agent. The agent then chooses the job on which the agent wants to schedule the callback.

In a running campaign, whenever the campaign meets the finish criteria specified in Campaign Creation Wizard, the system terminates the campaign, and as a result the callbacks which are not yet attempted are also terminated. The system updates such callback records with a completion code Callback Terminated.

You can apply time restrictions for the first action in the campaign strategy by specifying the Enable Time Restriction For Callback in global configurations. All time restrictions for the rest of the actions in the campaign strategy remain intact.

Agent callback

Agent callback is a personal callback which an agent can schedule. When an agent selects agent callback, the system displays all outbound agents which are not in NOT_READY, LOG_OUT, UNKNOWN or INBOUND_WORK states . The system displays the list to the agents who are working or anticipating the work . The agent can choose callback for self or to any other agent. If the system starts the callback, and the desired agent is busy with some other call, the systems keeps the callback in the queue of the agent and when agent is done with the current call activity, the queued callback is assigned to the agent.

All callbacks have an expiry time. The Campaign Manager (CM) checks the expiry time whenever callback matures that is, when callback scheduled time has arrived. In some cases, the system can present a callback to an agent before the callback matures due to the Callback Pre-Interval Time set in global configurations. In such a scenario, the PAM does not recheck the expiry time and dials the contact.

😵 Note:

The completion code updated by the agent after setting a callback is not processed by the strategy and is ignored.

In some cases where the callback maturity and the campaign start time are very close, the callback might get postponed as the agents are not attached to the job.

😵 Note:

The agent can set a callback for a number through the agent desktop even if the number is a part of a DNC list, but while running the campaign, the number is not dialed.

Multitenancy

Multitenancy in POM is based on Avaya Aura[®] Experience Portal. To use the multitenancy in POM, you need to enable multitenancy in Avaya Aura[®] Experience Portal, and create organizations and users. Depending on the organization to which the user belongs, or depending on the basic configuration settings, you can restrict the access to campaigns, reports, custom attributes, and data sources.

A root user or global user does not belong to any organization and performs the role of POM Administrator, and POM Campaign Manager. An organizational user or Org user belongs to an organization created in Avaya Aura[®] Experience Portal, and has the Org POM Campaign Manager role. For more information about multitenancy, see *Administering Avaya Aura[®] Experience Portal*.

POM reports

You can generate various POM reports using the EPM interface.

You can generate standard reports or custom reports. You can also schedule reports to be generated at a later date.

You can generate and view reports for different types of campaigns. For finite campaigns, you can generate and view the reports after successful completion of the first job instance.

For infinite campaigns, you can generate and view the report after the first archival interval. For more information about reports, see *Using Proactive Outreach Manager*.

Chapter 5: Interoperability

Product compatibility

The following table includes Avaya products that are compatible with POM. For an updated list, use the Compatibility tool on the Avaya Support web site at <u>http://www.avaya.com/support</u>.

Product	Release
Application Enablement Services	6.1, 6.2 FP 3
Avaya Aura [®] Contact Center	6.4 FP1
For more information on multicast configuration, see Avaya Aura® Contact Center — Proactive Outreach Manager integration guide on Avaya Support site at <u>https://support.avaya.com</u>	
Avaya Aura [®] Call Center Elite	5.2, 6.2, 6.3
Avaya Aura [®] Communication Manager	5.2, 6.2, 6.3
Avaya Aura [®] Experience Portal	7.0
Avaya Aura [®] Orchestration Designer	6.0, 7.0
Call Management System	16.3, 17.0
Avaya Aura [®] Session Manager	6.2, 6.3.2
Avaya Aura [®] Workforce Optimization	12.0
Communication Server 1000	7.6
Avaya Aura [®] Session Border Controller	6.3

Third-party connectivity

Avaya Proactive Outreach Manager (POM) 3.x supports Oracle, PostgreSQL, and MS-SQLServer 2012 databases. You can install the POM database either on PostgreSQL 9.0, or on Oracle 11g, or on MS-SQLServer 2012. POM supports Inisoft synTelate Desktop version 3.0.

Note:

If you install POM database schema on a local or external database, POM does not refer to the contents of the local or external database, or administration of the system. The administration of the system and contents of the database is the responsibility of the customer. In production environment, do not install POM database schema on local PostgreSQL.
Operating system compatibility

Avaya Proactive Outreach Manager is compatible with:

- Red Hat Enterprise Linux 6.4, 64 bit
- Avaya Enterprise Linux for Avaya Aura[®] Experience Portal 7.0

Browser compatibility

Avaya Proactive Outreach Manager is compatible with Internet Explorer 8.0.

😵 Note:

If you are using Internet Explorer version above 8.0, add the Web URL of the primary POM server in the **Compatibility View Settings** option of Internet Explorer to ensure the correct functionality and alignment of all UI elements.

Chapter 6: Architectural overview

The objective of this overview is to show architecture of POM and the performances impacting parameters for POM so that the solution designers can take necessary care of the components that might affect the performance.

Tomcat (on EPMS)

All POM web services and Experience Portal's AppInterfaceService are apache axis web services which run in Tomcat. The default installation on POM server has a maximum of 500 tomcat threads and the maximum Java virtual machine memory reserved for Tomcat is 1536 MB.

So each web service call increases a load on Tomcat. For example, only one web service call from the application supports for AvayaPOMNotifier sample application, whereas for a custom Avaya Aura[®] Orchestration Designer application, utilizing various POM PDC nodes in a call flow is supported. The web service call increases.

Database

Database is a critical component. All POM servers connects to the database. The load on the database increases with the increase in the POM servers, number of agents, and number of campaigns that are running on the system.

Media Processing Platform

Media Processing Platform is a critical component for Voice Campaigns as the Out call Web Server resides here. The POM driver and Nailer applications which are CCXML applications run on MPP. If a standalone MPP can support 1000 inbound calls on HP DL 360 G7 server, Quad Core, 12 GB RAM then the MPP can support up to 750 outbound calls.

Campaign manager worker threads

The Campaign manager worker threads created for a job depends on the total licenses allocated to the job. POM database in pim_config table configures the ports for every worker. The default value is 20. Every job creates a worker thread for each 20 outbound ports allocated to it. Each job creates minimum 2 worker threads regardless of the licenses allocated to the job.

Also, POM creates a state worker thread for every 5 agent licenses that are allocated to the job. POM creates a maximum of 100 worker threads for each Campaign manager process.

Campaign director threads

The Campaign director starts the Import manager. Import manager imports contacts or DNC records in POM database. Import manager starts an import job. Maximum import jobs that can run simultaneously are 30% of hibernatec3p0.max_size_PIMCD_Active configured in <code>PIMHibernate.cfg.xml</code> file. By default 30 simultaneous imports job can be run as default value of this parameter is 100. If more import jobs are created then the jobs are queued. All other

Campaign Director Threads are fixed and the threads are not dependent on licenses or any other performance factor.

Agent manager threads

For each zone agent manager creates 201 Agent worker threads, and 201 Router threads. Additionally, POM creates a pacing thread for each job.

Also, the Agent Manager creates the following threads for each zone which the agent manages.

- 1. WFO
- 2. dbUpdater
- 3. Call Pacer thread
- 4. Cleanup thread
- 5. JMSSubscriber
- 6. REventReceiver
- 7. Blender
- 8. Router
- 9. SocketServer
- 10. AM
- 11. CPCMSocketCommunicator
- 12. SSIChannel

Ensure that the solution designer has knowledge about all components while implementing a solution.

Chapter 7: Capacity and Scalability

Connection Pool and Database Sizing

The connection pool is configured as shown below in SPOM_HOME/config/
PIMHibernate.cfg.xml file.

```
property name="hibernate.c3p0.max_size_PIMCD_Active">100</property>
property name="hibernate.c3p0.max_size_PIMCM">100</property>
property name="hibernate.c3p0.max_size_PIMADMIN">100</property>
property name="hibernate.c3p0.max_size_PIMAGT_Active">100</property>
```

The default value of the connection pool is 100.

Connection Pool size in POM has to be set by considering following parameters:

- Total number of POM outbound ports
- Number of concurrent campaigns

In POM 3.x for every 20 outbound ports, one campaign worker thread is created for every POM server and minimum two threads are created for each job. So for 30 jobs, the default value of 100 is sufficient for a same operation. For more than 30 jobs, you are required to set the connection pool to a higher value.

The following table provides information about what minimum pool size one must set for different campaigns and how many corresponding database connections/sessions it opens on the POM database.

Number of Ports	Number of concurrent jobs	Campaign Manager Threads	Connection Pool Size on POM	Connections needed on Database server for				ver for
				Single POM Server	Two POM Servers	Three POM Servers	Four POM Servers	Five POM Server s
100	1	5	100	400	800	NA	NA	NA
100	5	15	100	400	800	NA	NA	NA
200	5	15	100	400	800	NA	NA	NA
200	10	30	100	400	800	NA	NA	NA
1000	5	50	100	400	800	1200	NA	NA
1000	10	50	100	400	800	1200	NA	NA

Number of Ports	Number of concurrent jobs	Campaign Manager Threads	Connection Pool Size on POM	Connections needed on Database server for				
				Single POM Server	Two POM Servers	Three POM Servers	Four POM Servers	Five POM Server s
2000	10	50	100	NA	800	1200	NA	NA
2000	20	100	100	NA	800	1200	NA	NA
5000	10	250	100	NA	NA	NA	NA	2000
5000	20	250	100	NA	NA	NA	NA	2000
5000	50	250	150	NA	NA	NA	NA	2200

😵 Note:

Set the hibernate.c3p0.max_size to more than the minimum required value for the same operation.

POM service restart is required after making changes to the <code>\$POM_HOME/config/PIMHibernate.cfg.xml file.</code>

If you have co-located Avaya Aura[®] Experience Portal Report Database on the POM database, then you must have a few more database connections.

Similarly, for an agent based job, POM creates a state worker thread for every 5 agent licenses allocated to the job. So, for 100 agents and one concurrent job, the number of campaign manager threads must be 20. For 20 concurrent jobs and 100 agents, number of campaign manager threads is 20. For agent based jobs, number of campaign manager threads does not depend on number of jobs.

Database server Disk size

Dedicated database servers were used for POM database. The Experience Portal Reporting Database was also configured on the same database server. The retention period settings on Avaya Aura[®] Experience Portal were set to default.

For voice/agent-based campaigns, following observations were made. The following are the disk size observations after 12 million contact attempts for voice/agent-based campaigns:

- Approximately 46 GB DB space was used.
- Space consumed by SDR is 6 GB and CDR is 2 GB.
- There were 1 million contacts in pim contact and 360 MB was used by the table.

The following table shows the memory space that are used by POM tables for POM server.

Table	Memory space used
pim_contact_attribute_history	5 GB
pim_contact_attempts_history	4 GB
pim_contact_history	3 GB

Table	Memory space used
pim_agent_contact_history	560 MB
	The size of the table increases only in case of agent- based campaigns.
pim_contact_attribute	472 MB
pim_contact_attempts	369 MB

For Email and SMS campaigns, Multimedia database and POM database both are used. On POM database, the database space consumed, depends on the number of contact attempts made and the respective POM tables.

Note:

The SDR and CDR tables are not applicable for Email or SMS campaigns.

Following are the disk size observations on Multimedia database after an hour's duration on running email or SMS campaign with 50,000 total contacts (4,000–5,000 contacts were processed).

- 5 MB Multimedia DB space was used.
- emailsdr/smssdr consumed around 3640 KB.
- emailcdr/smscdr consumed around 1728 KB.
- Notification was enabled for email/SMS increasing the table size of emailreceipt/smsreceipt to around 48 KB.

The following table shows the approximate database space consumed for single contact import. It was observed that the tables such as <code>pim_contact_attempts,pim_job_contact, pim_import_ds_job_dtl</code> consumed the database space considerably while the respective campaign or import jobs were running. After history creation or archival, the size of these tables reduces.

	Table	DB space
Increase in DB size for every single contact attempt	sdr This table is a part of the Avaya Aura [®] Experience Portal DB but running POM campaigns does have an impact on the table.	0.94 kb ~
	cdr This table is a part of the Avaya Aura [®] Experience Portal DB but running POM campaigns does have an impact on the table.	0.68 kb ~
	pim_contact_attribute	0.1208 kb ~
	pim_contact_attribute_history	0.1504 kb ~
	pim_contact_attempts_history	0.4102 kb ~
	pim_agent_contact_history	0.2724 kb ~

	Table	DB space
	The size of the table increases only in case of agent-based campaigns.	
Increase in DB size for every	pim_contact	0.3778 kb ~
single contact imported in the database	pim_import_ds_job_dtl_hstry	0.9950 kb~

😵 Note:

Additionally you can see, the Avaya Aura[®] Experience Portal help topic "External database requirements" to set the appropriate purging policy. Four custom attributes were used for the soaks.

Contact lists and import

You can have a maximum of 900 attributes (including system and the custom attributes) in the POM system. You can create up to 50 attributes using the **Add Multiple attribute** on the attributes page.

Sr. No.	Data Type	No. of attributes	Time Taken to insert 10000 records	Time taken to update 10000 records
1	Email	10	2 minutes	2 minutes
2	Phone	10	4 minutes	48 minutes
3	Date	10	2 minutes	2 minutes
4	Float	10	1 minutes	2 minutes
5	String	10	1 minutes	2 minutes
6	Time	10	3 minutes	3 minutes
7	Timestamp	10	3 minutes	3 minutes
8	all attributes, single datasource	154	43 minutes	
9	all attributes, 3 datasources (3k, 3k, 4k records)	154	22 minutes	

Table 1: Time required for uploading different types of attributes

The data in the table is for file based import from SFTP source, and POM database was on external Microsoft SQL Server. You might get different results depending on your database environment (PostgreSQL or Oracle), number of attributes in the contact file, usage on the source database, and network speed.

😵 Note:

You can configure multiple data sources for the same contact list and run those concurrently to improve the import speed. A contact list importing 10,000 records using a single data source would take more time than the same contact list importing the same number of records which are divided into three or more data sources.

Example

To import 10,000 records in a contact list, you can configure 3 data sources. Each data source will fetch distinct records.

Datasource1 will import first 3000 records. Similarly datasource2 will import the next 3000 and datasource3 will import the remaining 4000 records. This behavior can be seen in the 8th and 9th rows in the above table.

Recommendations

- The records are not in a sorted order in the POM database.
- Do not select the "Empty Contact List before Import" option for these data sources. You might need to empty the contact list manually before starting the multiple datasources.
- Divide the records between 3–6 data sources.

Web services performance

You can access POM features and functionality programmatically, by using Web services. Apache JMeter was used to load test the various web services available in POM by creating different number of concurrent threads to know the performance of different web services method.

The following table represents the throughput and successful web services request per second. This test was on a single box POM installation and 100 ports concurrent outbound calls were running while performing the test.

Web service	Method	Concurrent requests	ThroughPut (sec)	Succesful requests per second
AgentAPI	AddContactFromListToJo b	500	80	6
	GetContactAttributeValue	500	95	5
	DeleteContactFromList	500	40	13
	GetContactDataFromList	500	130	4
	AddToDNCList	1000	60	17
	UpdateContactAttributeVa lueToList	500	100	5
	GetPhoneNumber	500	75	7

Web service	Method	Concurrent requests	ThroughPut (sec)	Succesful requests per second
	UpdatePhoneNumber	500	80	6
	GetContactAttributeValue FromList	500	140	4
	SaveContactToList	300	25	12
	IsDNC	1000	60	17
	RemoveFromDNCList	500	85	6
	ScheduleCallBack	500	75	7
	UpdateCampaignAttribute Value	500	90	6
	AddContactListToJob	5	1.8	3
	UpdateAgentAttributeValu e	500	100	5
	UpdateCompletionCode	500	100	5
Campaign Management	GetActiveJobTaskIds	100	90	1
	GetCampaignJobs	100	90	1
	GetActiveJobTaskIdForTa sk	100	90	1
	SetMaxAttemptsCountFor Task	5	1.2	4

Email capacity

Primary EPM – 12,500 Email's/hour

Auxiliary EPM - 25,000 Email's/hour

Single box – 2500 Email's/hour

More Aux EPM's adds more capacity. The numbers in the following table are pacing enabled.

	Primary EPM capacity (Messages/hour)	Auxiliary EPM capacity	Single box system capacity
		(Messages/hour)	(Messages/hour)
Outbound only	Up to 22,500	Up to 30,000	Up to 4,500
Outbound with notification and delivery enabled	Up to 11,250	Up to 22,500	Up to 2,250

Inbound and Outbound	Up to 11,250	Up to 22,500	Up to 2,250
together (without notification			
and delivery enabled)			

Single Box Server



In this configuration all entities, that is EPMS, POM, MPP, Database Server and Application Server are located on the same server.

For some soaks the attachment size used was 1MB. The numbers shown in the table are for a single campaign. Increasing the number of campaigns does not make a difference as the pacing must be the same across the entire system that is, in single box configuration maximum outbound emails supported is 4,500. So, while running 2 email campaigns the pace must be set at 2250 for each campaign. The average CPU utilization was around 25% and the average memory usage was around 40%. The contact attempts made in an hour for different email servers, different delivery configurations, and for different attachments are as follows:

Delivery	Contacts	Pace	Attempts per hour	Attachment	Email Server
Y	10,000	2,500	~2,490	None	MSExchange
Ν	10,000	5,000	~4,990	None	MSExchange
Ν	10,000	5,000	~4,980	1MB	MSExchange
Y	10,000	2,500	~2,490	1MB	MSExchange
Ν	10,000	5,000	~4,990	None	James
Ν	10,000	5,000	~4,980	1MB	James

One POM server on Primary EPM



In this configuration POM is located on the Primary EPMS.

For some soaks the attachment size used was 1MB. The average CPU utilization was around 35% and the average memory usage was around 40%. The contact attempts made in an hour for different email servers, different delivery configurations, and for different attachments are as follows:

Delivery	Contacts	Pace	Attempts per hour	Attachment	Email server
Y	50,000	11,250	~10,300	None	MSExchange
Y	50,000	11,250	~5,900	1MB	MSExchange
N	50,000	22,500	~19,200	None	MSExchange
Ν	50,000	22,500	8,300	1MB	MSExchange
N	50,000	22,500	~18,800	None	James
Ν	50,000	22,500	~5,900	1MB	James

😵 Note:

The data for number of attempts is for a single job.



Two POM servers; one on primary EPM and one on auxiliary EPM

In this configuration, 2 POM servers; one residing on Primary EPMS and other on Auxiliary EPMS are used.

For some soaks, 1MB attachment size is used. The average CPU utilization was around 35% and the average memory usage was around 40%.

No. of Aux EPM's	Delivery	Contacts	Pace	Attempts per hour	Attachment	Email server
1	Y	50,000	33,750		None	MSExchange
1	Y	50,000	33,750		1MB	MSExchange
1	N	60,000	52,500		None	MSExchange
1	N	60,000	52,500		1MB	MSExchange
1	N	60,000	52,500		None	James
1	Ν	60,000	52,500		1MB	James

Note:

The data for number of attempts is for a single job. Also, increase in 1 Aux EPM and POM increases the capacity by 30,000 emails per hour.

SMS capacity

Primary EPM – 12,500/2 = 6250 SMSes/hour

Auxiliary EPM - 25,000/2 = 12500 SMSes/hour

Single box - 2500/2 = 1250 SMSes/hour

The following table shows the maximum supported numbers in 3 different server configurations.

	Primary EPM capacity (Messages/hour)	Auxiliary EPM capacity (Messages/hour)	Single box system capacity (Messages/hour)
Outbound only	Up to 22,500	Up to 30,000	Up to 4,500
Outbound with notification and delivery enabled	Up to 5,625	Up to 11,250	Up to 1,125
Inbound and Outbound together (without notification and delivery enabled)	Up to 11,250	Up to 22,500	Up to 2,250

The numbers in the table are pacing enabled.

Also, these numbers depend on the capacity of the SMS service provider.

Note:

Even if you can control the rate at which SMS can be sent to the SMSC from POM, ensure that the SMS reaches immediately to the intended recipient. Once the SMS is delivered to SMSC, it might take from minutes to hours to reach the recipient.

Single Box Server



In this configuration all entities, that is EPMS, POM, MPP, Database Server and Application Server are located on the same server.

The following numbers are for a single campaign. Increasing the number of campaigns does not make a difference as the pacing must be the same across the entire system that is, in a single box configuration the maximum outbound SMSes supported is 4,500. So, while running 2 email

campaigns the pace must be set at 2250 per campaign. The average CPU utilization was around 30% and the average memory usage was around 40%.

Email/SMS	Delivery	Notification	Contacts	Pace	Attempts per hour
SMS-SMPP	Y	Y	10,000	1,250	~1,240
SMS-SMPP	N	Y	10,000	2,500	~2,490
SMS-SMPP	N	N	10,000	5,000	~4,980
SMS-SMPP	Y	N	10,000	2,500	~2,490
SMS-HTTP	N	N	10,000	2,500	~2,490

One POM server on primary EPM



In this configuration POM is located on the Primary EPMS.

The average CPU utilization was around 35% and the average memory usage was around 40%.

SMS type	Delivery	Notification	Contacts	Pace	Attempts per hour
SMS-SMTP	Y	Y	50,000	5,625	~5,100
SMS-SMTP	N	Y	50,000	11,250	~10,400
SMS-SMTP	N	N	50,000	22,500	~20,100
SMS-HTTP	N	Y	50,000	11,250	
SMS-HTTP	N	N	50,000	22,500	

😵 Note:

The data for number of attempts is for a single job.



Two POM servers; one on primary EPM and one on auxiliary EPM

In this configuration, 2 POM servers; one residing on Primary EPMS and other on Auxiliary EPMS were used.

SMS type	No. of Aux EPM's	Delivery	Notification	Contacts	Pace	Attempts per hour
SMS-SMTP	1	Y	Y	50,000	16,875	~5,100
SMS-SMTP	1	Ν	Y	50,000	33,750	~10,400
SMS-SMTP	1	N	N	60,000	52,500	~20,100
SMS-HTTP	1	N	Y	50,000	33,750	
SMS-HTTP	1	N	N	60,000	52,500	

😵 Note:

The data for number of attempts is for a single job.

Conclusion

The following table lists the number of agents and available ports on a HP DL 360 G7 server with Quad core processor, and 12 GB RAM. In addition to configuring POM correctly, ensure you plan external system requirements such as Media Processing Platform (MPP)s, database servers, email servers, and SMPP connections.

Number of agents, Setup No. of Compor				Ports	Maximum
Predictive/Preview	type	servers	Components	availability	simultaneous campaigns
1-60 (Predictive)	Single	1	EPM, POM,	300 ports	20
OR	box		MPP, DB, App server		
1-75 (Preview)					
1-100 (Predictive)	Single	2	1 EPM/POM	300 ports	20
1-120 (Preview)	box with separate		Server, MPP Server		
	DB*		1 DB server		
61-250 (Predictive)	Multi Box with	3	1 EPM/POM Server	750 ports	20
75-310 (Preview)	Single		1 MPP Server		
		1 DB server			
251–400 (Predictive)	Multi Box	4	1 EPM/POM	1500 (750 X	20
310-500 (Preview)	with Single		Server	2) ports	
	POM		2 MPP Servers		
			1 DB server		
401-500 (Predictive)	Multi Box	5	2 EPM/POM	1500 (750 X	50+
501-625 (Preview)	with 2 POM		Servers	2) ports	
			2 MPP Servers		
			1 DB server		
501-900 (Predictive)	Multi Box	3 +	2 EPM/POM	750X	50+
625-1000 (Preview)	with 2 POM	Number of MPP(s)	Server	Number of MPP(s)	
	FUIVI		1 DB server	WIFF(5)	
			Number of MPP(s) as per the above mentioned formula		

You can get performance results with 110 predictive agents on this particular configuration If you are using 110 predictive agents, ensure your overdial ratio for progressive jobs, and the hit rate for predictive jobs impacting the number of calls dialed are in synchronization with the number of MPP ports. This configuration and the number of agents can support an overdial ratio of 2 for progressive jobs, or a hit rate of 50% for predictive jobs, since the MPP ports requirement increases beyond the maximum 300 MPP ports supported. To increase the overdial ratio for progressive jobs, or to reduce the hit rate for predictive jobs, you must run the jobs with fewer agents.

The **Maximum simultaneous campaigns** indicate the maximum number of jobs started and stopped simultaneously with maximum number of agents participating in jobs.

To increase the number of job instances, please refer point 5 in the "Important Observations" section. However while increasing the number of jobs beyond the recommended number, ensure that not more than 10 jobs start or stop simultaneously.

The application servers hosting POM applications are not considered in the given calculations.

If you have a single POM server deployment, you can limit the number of concurrent jobs to 20 for optimal results. If you have a dedicated POM server deployment or a multiple POM server deployment you can limit the number of concurrent jobs to 50 for optimal results. The number of maximum simultaneous jobs will be 'variable' and it will depend on the number of handlers used in the strategies which are associated with the jobs.

You can configure the **Maximum concurrent jobs** from **POM Home > Configurations > Global Configurations** page.

Important observations

Database connections exceeding the configured value

In a single box setup, where the POM database resides on the same server, if you schedule multiple campaigns to start simultaneously, then POM server opens multiple database connections. The value may exceed the default value of 300 and can affect the campaigning process. To avoid this, if you want to start multiple campaigns simultaneously, for example, 15 or more campaigns, then ensure you open maximum connections at the database level. Alternatively, you can start simultaneous multiple campaigns, scheduled a few seconds apart.

Database re-indexing on PostgreSQL

In a single box setup, if the database size increases to 13–15 GB (including the index size), then the database connections exceed the maximum limit for certain scenarios. Initially, the database connections exceeded while running 20 campaign scenarios. However, at later stages, it failed for 1 and 15 campaign scenarios. This degrades the system performance considerably.

Since the database size increased considerably due to index size, re-indexing was required at least once a week. After re-index, the number of attempts improved for Email and SMS campaigns.

POM provides a re-index script for PostgreSQL to address the system performance issues. If the table index size value exceeds the actual table size value, the system performance may degrade. The database transactions happen at a slower pace. For more information, refer the "Performance issues with POM server" section under Chapter 8 in the *Troubleshooting Proactive Outreach Manager* guide.

Database purging

With each single run, the database size increases depending on the attempts we make during the day. As the database size increases, it takes longer time to process each request. Therefore, ensure you purge the data regularly to enhance the performance of the system.

For soak runs, the retention period was set to 30 days and the purging was set to run daily at 2 a.m. Ensure that the database size does not increase beyond 10-12 GB. To set the appropriate purging policy, refer *External database requirements*.

Campaigns with Progressive dialing

For the campaigns with Progressive dialing, as the Overdial ratio increases, the number of contact attempts increase. You will see an additional increase in attempts if the number of campaigns increases.

While deciding the Overdial ratio for a campaign, the administrator must also consider the hit rate (percentage of successful connects with the customer). This brings down the MPP port requirement. For example, if the approximate hit rate is 50 %, then set the Overdial ratio as 2. This avoids unnecessary allocation of MPP ports which occur if Overdial ratio is set to 5.

If you run 20 campaigns (for single POM and single handler strategy) and 50 campaigns (for Multi POM and single handler strategy) concurrently, then the Average CPU and Memory consumption can increase considerably. However, you can run more number of concurrent jobs on a multi-POM set-up by reducing the number of agents on the system.

Test started with 150 Preview jobs (single handler strategy) and 150 agents, with CPU and memory being monitored. Both POM servers were 12 GB Quad Core and 12 GB RAM Gen7 HP Servers.

The job count as well as the agent count was gradually increased. The system was stable till agent count was 445 and job count was 300 (with a single handler strategy).

Agent Count	Job Count	% CPU on POM1	% Memory on POM1	% CPU on POM2	% Memory on POM2
150	150	15	40	15	30
400	150	20	45	20	35
400	200	25	50	15	40
400	250	15	57	15	48
400	300	20	58	20	48
445	300	20	58	20	48

The following are the observations till approximately 36 hours after start of the test:

For a single POM setup (MPP's and database on separate servers), the system was stable for 120 Preview jobs run with 125 logged in agents. The maximum CPU utilization was around 35% and the maximum Memory utilization was around 50%.

The following are the details of the test performed:

Server: HP Gen7 server with 12GB RAM and 16 CPU Quad Core configuration

Number of concurrent jobs: 120

No of agents: 125

Records in contact Lists: 100000

Records per camp: 5K, 10K, 20K, 50K, 100000

Test Duration: 60+ Hours

Campaign Types: Preview, Predictive, progressive, time based call pacing, notification, Email, SMS, time based email and SMS pacing, infinite campaign with contact lists, infinite campaign without contact list with record added from web service and time based finish criteria applied.

Lab settings

The following are the settings used in the lab environment:

MSSQL

To configure MSSQL, keep all the default settings except the following:

Configuration	Value
Is Read Committed Snapshot On	True
RAM	16GB to 20GB
tempdb	Consult a database administrator for best practices for tempdb.

Oracle

To configure Oracle, keep all the default settings except the following **Processes** settings:

Configuration	Value for Processes
Oracle 11G R2	The default value for processes is 150. Configure the process value to 1000 for 500 agents and 200 jobs.
Oracle 12c	The default value for processes is 300. Configure the process value to 1000 for 500 agents and 200 jobs.

Server data

The following lab data is the reference data for a server. Contact a database administrator for installation and configuration of POM database on your Oracle server.

Oracle 11 G R2 (Standard)

- HP Gen-7 with 2.40 GHz Dual CPU, Quad-Core processor with 12 GB RAM,
- 7GB out of 12GB allocated to DB server (60% memory of hardware Server).
- · While creating a database instance:
 - Create a general purpose database.
 - Set recovery area size is 4GB (Default).
 - Set the memory to 40%, and check if managed by automatic memory management.
 - The default processes are 300, change the value to 1000 as per performance need.
 - Select the default character set.
 - Set the server mode to Dedicated Server mode.
 - Set the database block size to 8KB (Default).

- Set the pga aggregate target to 1180MB (Default).
- Set the sga target to 3540MB (Default).
- Confirm there are 3 redo log groups with 51MB size (Default).

Oracle 12 c (Enterprise)

- HP Gen-7 with 2.40 GHz Dual CPU, Quad-Core processor.
- 7GB out of 12GB allocated to DB server (60% memory of hardware Server).
- While creating a database instance:
 - Create a general purpose database.
 - Set recovery area size is 4GB (Default).
 - Set the memory to 40%, and check if managed by automatic memory management.
 - The default processes are 300, change the value to 1000 as per performance need.
 - Select the default character set.
 - Set the server mode to Dedicated Server mode.
 - Set the database block size to 8KB (Default).
 - Set the pga aggregate target to 1180MB (Default).
 - Set the sga target to 3540MB (Default).
 - Confirm there are 3 redo log groups with 51MB size (Default).

Postgres

To configure Postgres, keep all the default settings except the following:

Configuration	Value
max_connections	800 for 500 agents and 50 jobs.
Postgres database server	Consult a database administrator to properly tune
	the Postgres database server.

Call classification analysis recommended settings and detection percentage

Depending on the settings you configure for call classification analysis (CCA), you might get different detection percentage.

Recommended settings for CCA

Home > System Configuration > MPP Servers > VoIP Settings > Call Progress	
Threshold:	
Voice	0.5

Tone	0.95
Periodicity	0.97
Ring count	4
Cut through	
Initial	1100
Long	700
Short	1100
Max voice:	
Initial	2000
Long	2000
Short	2000

Detection percentage for CCA

Based on the recommended settings mentioned in the above table, the CCA detection percentage is as follows:

Table 2: Notification campaigns

CCA start	Sample type	Detection percentage
On Connect	Live Voice (Cell phone)	96.52
On Connect	Live Voice (Land Line)	91.67
On Connect	Answer Machine (Cell Phone)	94.1
On Connect	Answer Machine (Land Line)	93.4
On Progress	Live Voice (Cell Phone)	96.8
On Progress	Live Voice (Land Line)	90.1
On Progress	Answer Machine (Cell Phone)	95.8
On Progress	Answer Machine (Land Line)	94.1

Table 3: Agent campaigns with compliance timers off

CCA start	Sample type	Detection percentage
On Connect	Live Voice (Cell Phone)	96.5
On Connect	Live Voice (Land Line)	92.01
On Connect	Answer Machine (Cell Phone)	96.18
On Connect	Answer Machine (Land Line)	96.18
On Progress	Live Voice (Cell Phone)	97.56
On Progress	Live Voice (Land Line)	93
On Progress	Answer Machine (Cell Phone)	95.13
On Progress	Answer Machine (Land Line)	95.13

CCA start	Sample type	Detection percentage
On Connect	Live Voice (Cell Phone)	92.7
On Connect	Live Voice (Land Line)	85.9
On Connect	Answer Machine (Cell Phone)	54.1*
On Connect	Answer Machine (Land Line)	65.27*
On Progress	Live Voice (Cell Phone)	92.7
On Progress	Live Voice (Land Line)	86
On Progress	Answer Machine (Cell Phone)	53.64*
On Progress	Answer Machine (Land Line)	63.5*

Table 4: Agent campaigns with compliance timers on

Requirements for database login

The Avaya POM database server requires an administrative login with DBA privileges for your database. The administrative login must be a DBA login ID for the database server. The following table shows typical values for this administrative login. If you choose to use a different administrative login, make sure that login has the same permissions as the login listed in the following table:

Property	Microsoft SQL Server 2012	Oracle	PostgreSQL
Database Administration Login	sa	system	postgres
Database Administration Password	password for sa	password for system	password for postgres

Database servers act as a central repository for all the information that POM stores and retrieves. You can install and configure database servers in a number of ways to provide scalability, fault tolerance, and security to meet the specific requirements of your organization.

Important:

Database server installation and configuration are beyond the scope of this manual. Consult a qualified Database Administrator (DBA) to deploy your chosen database platform.

Fine tuning Oracle parameters

About this task

Perform the following steps to ensure optimum performance on Oracle database:

Procedure

1. Set the FILESYSTEMIO_OPTIONS parameter to **SETALL** by typing:

SQL> SHOW PARAMETER FILESYSTEMIO OPTIONS NAME TYPE VALUE _____ ____ filesystemio options string none SQL> ALTER SYSTEM SET FILESYSTEMIO OPTIONS-SETALL SCOPE-SPFILE; System altered. SQL> SHUTDOWN IMMEDIATE Database closed. Database dismounted. ORACLE instance shut down. SOL> STARTUP ORACLE instance started. Total System Global Area 926941184 bytes Fixed Size1222672 bytesVariable Size239077360 bytesDatabase Buffers683671552 bytesRedo Buffers2969600 bytes Redo Buffers 2969600 bytes Database mounted. Database opened. SQL> SHOW PARAMETER FILESYSTEMIO OPTIONS VALUE NAME TYPE _____ filesystemio_options string SETALL SQL>

2. Set the Initrans value for pim_job_contact to 5 by typing:

SQL> select * from user_tables where table_name = 'PIM_JOB_CONTACT'

SQL> alter table pim job contact initrans 5

Check the pctfree values for pim_contact, pim_job_contact, pim_contact_attempts table by typing:

SQL> select * from user tables where table name = '<tablename>';

 Set the pctfree values in the pim_contact as 20, pim_job_contact as 20, and pim_contact_attempts as 30 by typing:

SQL> alter table pim_contact pctfree 20 ; SQL> alter table pim_job_contact pctfree 20; SQL> alter table pim_contact attempts pctfree 30;

Fine tuning MSSQL parameters

About this task

Perform the following steps to ensure optimum performance on MSSQL database:

Procedure

1. While creating a database for POM schema, if you are using the MSSQL database, set the READ_COMMITTED_SNAPSHOT database parameter ON.

If you do not set the parameter to On, you might experience that campaigns are getting stuck and you might see the following error message in the logs files:

Exception occurred Module POMCM Method JobContactBO.java.updateActionState Exception Type org.hibernate.exception.LockAcquisitionException: could not execute update query, Please see POM log files for details

2. To verify that the READ_COMMITTED_SNAPSHOT parameter is ON on existing database, type the query SELECT is_read_committed_snapshot_on FROM sys.databases WHERE name= 'YourDatabase'.

The query will return one of the following:

- 1 = READ_COMMITTED_SNAPSHOT option is ON. Read operations under the readcommitted isolation level are based on snapshot scans and do not acquire locks.
- 0 = READ_COMMITTED_SNAPSHOT option is OFF (default). Read operations under the read-committed isolation level use share locks.
- 3. You can change the parameter by typing ALTER DATABASE<database_name> SET READ COMMITTED SNAPSHOT ON;

😵 Note:

Before running this query make sure that you stop all the POM servers and also stop VPMS services. It is advised to run this SQL command immediately after creating the database or after running installDB.sh script.

4. If a database uses either the full, or bulk-logged recovery model, you must back up the transaction log regularly to protect your data and to prevent the transaction log from getting full. For more information on Recovery Model and transaction log management, refer Microsoft SQL server documentation or consult a qualified database administrator.

TempDB configuration

Perform the following steps to configure tempDB:

- Set the tempDB to "auto grow".
- Ensure the disk has free space.
- Set the initial size of tempDB to one-third of DB size.
- If possible, put the tempDB on a separate disk.
- Set the recovery model of the tempDB to SIMPLE. This model reclaims the log space automatically.

Network configuration

All of the machines in the Experience Portal environment (EPM/POM, MPPs, Database, Speech Servers, and Application Servers) should be configured on the same LAN switch. All physical network connections to these servers should be at least 1 Gbps.

Scheduling maintenance

About this task

Perform the maintenance activities in any of the following scenarios:

- To ensure optimum performance.
- If you observe unusual tempDB growth or increased CPU usage.
- For PostgreSQL database, if you experience re-indexing issues.

Procedure

- 1. Pause all running jobs.
- 2. Take a backup of POM database.
- 3. Stop the POM server by typing service POM stop.
- 4. Stop the application server by typing service appserver stop.
- 5. Stop MPP by typing service mpp stop.
- 6. Stop MMS server by typing service mmsserver stop.
- 7. Stop VPMS by typing service vpms stop.
- 8. Stop the POM database server.
- 9. Start POM database server.
- 10. Start the POM server by typing service POM start.
- 11. Start the application server by typing service appserver start.
- 12. Start MPP by typing service mpp start.
- 13. Start MMS server by typing service mmsserver start.
- 14. Start VPMS by typing service vpms start.

VMware recommendations

Below is the maximum number of recommended outbound ports & agents for different POM deployment. Your maximum number may vary based on application complexity, ESXi hardware, CPU speed, service provider and other factors:

Table 5: For VM with 16 vCPUs and 12 GB RAM

Type of Installation	Max number of POM outbound Ports	Max number of preview agents	Max number of predictive agents
Multi Box (1 POM + EPM on one Virtual Machine and MPPs on different Virtual Machines)	670	335	270
Multi Box (2 POM + EPM's on two Virtual Machines and MPPs on different Virtual Machines)	1340	670	600

For MPP port sizing & configuration, see *Application Notes for Avaya Aura® Experience Portal 7.0* on VMware vSphere on Support site.

The number provided by EP for inbound will be reduced by about 60% while doing outbound, that is when using POM. So if EP supports 350 ports per MPP, then for POM, it will be approximately 140 ports.

Table 6: VM for 24 vCPUs and 18 GB RAM

Server requirement: number of CPUs: 24, Memory required: 18 GB					
Number of agents (Predictive / Preview)	Setup type	Number of servers	Components	Ports availability	Max. simultaneously campaigns
1–60 (Predictive)	Single box	1	EPM, POM, MPP, Database	300	20
OR			and Application server		
1–75 (Preview)					
1–100 (Predictive)	Single box with separate	2	1 EPM/POM server, MPP	300	20
1–120 (Preview)	database		server		
			1 database server		
61–250 (Predictive)	Multi box with single POM	3	1 EPM/POM server	750	20
75–310			1 MPP server		
(Preview)			1 database server		

Server requirem	Server requirement: number of CPUs: 24, Memory required: 18 GB				
Number of agents (Predictive / Preview)	Setup type	Number of servers	Components	Ports availability	Max. simultaneously campaigns
251–400 (Predictive)	Multi box with single POM	4	1 EPM/POM server	1500 — 750*2	20
310–500			2 MPP servers		
(Preview)			1 database server		
401–500 (Predictive)	Multi box with 2 POM	5	2 EPM/POM servers	1500 — 750*2	50+
501–625			2 MPP servers		
(Preview)			1 database server		
501–900 (Predictive)	Multi box with 2 POM	3+ number of MPPs	2 EPM/POM servers	750* number of MPPs	50+
625–1000 (Preview)			1 database server		
			Number of MPPs as per the above mentioned formula		

For MPP VM footprint you must have 16 vCPUs and 12 GB RAM to get 500 maximum telephony ports per server.

Email

Below is the maximum number of recommended multi-media messages per hour for Primary and Auxiliary EPM virtual machine servers to process. Your maximum number may vary based on application complexity, ESXi hardware, CPU speed, service provider and other factors. Large email size and attachments will substantially reduce expected throughput.

Table 7: Email capacity on VMware

	Primary EPM capacity	Auxiliary EPM capacity
	(Messages/hour)	(Messages/hour)
Outbound only	Up to 15,100	Up to 20,100
Outbound with notification & delivery enabled	Up to 7,500	Up to 15,100
Inbound & Outbound together (without notification & delivery enabled)	Up to 7,500	Up to 15,100

SMS

Table 8: SMS capacity on VMware

	Primary EPM capacity	Auxiliary EPM capacity
	(Messages/hour)	(Messages/hour)
Outbound only	Up to 15,100	Up to 20,100
Outbound with notification & delivery enabled	Up to 3,800	Up to 7,500
Inbound & Outbound together (without notification & delivery enabled)	Up to 7,500	Up to 15,100

For further details, see Application Notes for POM 3.0.1 on VMWare from the Support site.

Chapter 8: Licensing requirements

POM is a managed application on Avaya Aura[®] Experience Portal. Hence the license requirement and the availability depends on Avaya Aura[®] Experience Portal.

The Experience Portal Manager (EPM) contacts an Avaya WebLM server regularly to determine the number of licenses that are authorized for your system. For security reasons, ensure that the license server runs WebLM version 4.4 or later, and install a valid Avaya Aura[®] Experience Portal 7.0 license on the license server.

After receiving information about authorized licenses, EPM allocates the available licenses among the Media Processing Platform (MPP) servers in the system. Avaya Aura[®] Experience Portal requires a license for:

Component	Description
Telephony ports	You can use one connection or port for voice activities with each license. A Avaya Aura [®] Experience Portal system supports up to 10,000 telephony ports.
	For agent-based campaigns, you need 1 telephony port for agent nail up connection, 1 telephony port for dialing out a customer, and 1 telephony port as a bridge the agent nailed-up call and the customer call. The third port is used for this bridging and then released.
	Note:
	To configure an authorized telephony port on the Avaya Aura [®] Experience Portal system, you must establish an H.323 or SIP connection. For agent- based campaigns, you must have a SIP connection.
Automatic Speech Recognition (ASR) connections	You can use one connection or port for speech recognition activities with each license. If you do not purchase any ASR licenses, you cannot configure ASR servers on your system.
	You need one ASR license for each call that requires ASR resources. The license does not become available again until the call is complete.
Text-to-Speech (TTS) connections	You can use one connection or port for speech recognition activities with each license. If you did not purchase any TTS licenses, you cannot configure TTS servers on your system.
	You need one TTS license while a call is using TTS resources. When the call stops using TTS resources, the license becomes available to other calls.
SMS licenses	You must configure adequate number of SMS licenses to run SMS campaigns. For more information about SMS licenses, see <i>Avaya Aura[®] Experience Portal</i> documentation.

Component	Description
Email licenses	You must configure adequate number of email licenses to run email campaigns. For more information about SMS licenses, see <i>Avaya Aura[®] Experience Portal</i> documentation.

😵 Note:

License allocation can be either reserved or dynamic.

Reserved licenses

The licenses which are not reallocated to other jobs or task unless recalculation occurs are called reserved licenses.

In case of reserved licenses, the campaign job or task does not release the licenses though the campaign job or task might not need the licenses.

The licenses allocated to the reserved job or task will be retained till the recalculation happens. Jobs or tasks with reserved licenses cannot trigger the recalculation.

The license recalculation can occur when:

- A new job starts.
- A job is stopped.
- A job is paused.
- A job is resumed.
- If you change the priority, minimum port, or maximum ports value through the POM monitor.
- A dynamic job is not using the allocated quota, and there are other jobs in the system who need more licenses.
 - In case of dynamic jobs with outbound or notification licenses, if the job does not make call attempt for a duration of 1 minute then it is considered that the dynamic job does not need more licenses.
 - In case of dynamic jobs with agent licenses, if the job does not make call attempt for a duration of 1 minute then it is considered that the dynamic job does not need more licenses.

Whenever license recalculation is triggered, the license quota for all jobs is recalculated irrespective of their allocation type.

Dynamic licenses

POM 3.x helps in better allocation and license management with the help of dynamic licensing. Dynamic licensing is useful for a job or a task that does not require all allocated licenses. There are other jobs or tasks that require more licenses than the allocated licenses, simultaneously. With the help of dynamic licensing, the system can release some licenses and assign the licenses to the other jobs or tasks.

You can choose to use reserved licensing or dynamic licensing. If you choose dynamic licensing, you must remember that:

- Only dynamic jobs or the tasks can donate the additional or excess licenses
- Any job or the task can borrow the additional or excess licenses

- No job or the task can use more licenses than the maximum value specified in the campaign strategy
- Dynamic jobs or the tasks always reserve minimum licenses specified the campaign strategy although the job or task might not need the licenses.
- Dynamic jobs or the tasks start donating licenses. Only the current job or the task does not request for a license and the other jobs need more licenses.
- After donating licenses, dynamic jobs or the tasks get the license back only when the dynamic job or the task needs the licenses.
- The system allocates the licenses that are released by dynamic job to other jobs according to their priorities, and the minimum and the maximum values.

The licenses allocated to the reserved job or task will be retained till the recalculation happens.

The license recalculation can occur when:

- A new job starts.
- A job is stopped.
- A job is paused.
- A job is resumed.
- If you change the priority, minimum port, or maximum ports value through the POM monitor.
- A dynamic job is not using the allocated quota, and there are other jobs in the system who need more licenses.
 - In case of dynamic jobs with outbound or notification licenses, if the job does not make call attempt for a duration of 1 minute then it is considered that the dynamic job does not need more licenses.
 - In case of dynamic jobs with agent licenses, if the job does not make call attempt for a duration of 1 minute then it is considered that the dynamic job does not need more licenses.

Whenever license recalculation is triggered, the license quota for all jobs is recalculated irrespective of their allocation type.

Chapter 9: Related resources

Related resources

Documentation

For information on feature administration, interactions, considerations, and security, see the following POM documents available on the Avaya Support site at http://www.avaya.com/support:

Title	Description	Audience	Document location
Implementing Proactive Outreach Manager	Provides information about installing and configuring Proactive Outreach Manager.	Implementation engineers	The latest PDF is available on the Avaya Support site at <u>Implementing</u> <u>Proactive Outreach</u> <u>Manager</u> .
Upgrading Proactive Outreach Manager	Provides information about upgrading Proactive Outreach Manager.	Implementation engineers	The latest PDF is available on the Avaya Support site at <u>Upgrading</u> <u>Proactive Outreach</u> <u>Manager</u> .
Developer Guide for Proactive Outreach Manager	Provides information about the methods and properties used for the Web interface of Proactive Outreach Manager, and various custom classes and application files.	System administrators Implementation engineers Users	The latest PDF is available on the Avaya Support site at <u>Developer Guide</u> for Proactive Outreach Manager.
Using Proactive Outreach Manager	Provides general information about field descriptions and procedures for using Proactive Outreach Manager.	Users	The latest PDF is available on the Avaya Support site at <u>Using Proactive</u> <u>Outreach Manager</u> .
Troubleshooting Proactive Outreach Manager	Provides general information about troubleshooting and resolving system problems, and detailed information	System administrators	The latest PDF is available on the Avaya Support site

Title	Description	Audience	Document location
	about and procedures for finding and resolving specific problems.	Implementation engineers Users	at <u>Troubleshooting</u> <u>Proactive Outreach</u> <u>Manager</u> .
Proactive Outreach Manager Agent API	Provides information about the methods and properties used for the Web interface.	System administrators Implementation engineers Users	The latest PDF is available on the Avaya Support site at <u>Proactive</u> <u>Outreach Manager</u> <u>Agent API</u> .
Avaya Aura [®] Contact Center — Proactive Outreach Manager Integration	Provides conceptual and procedural information about the integration between Avaya Aura [®] Contact Center (AACC) and Proactive Outreach Manager (POM). Describes the tasks required for AACC and POM integration.	Users	The latest PDF is available on the Avaya Support site at <u>Avaya Aura®</u> <u>Contact Center —</u> <u>Proactive Outreach</u> <u>Manager</u> <u>integration</u>

You must install Avaya Aura[®] Experience Portal before you install POM.

Related links

Finding documents on the Avaya Support website on page 69

Finding documents on the Avaya Support website

About this task

Use this procedure to find product documentation on the Avaya Support website.

Procedure

- 1. Use a browser to navigate to the Avaya Support website at http://support.avaya.com/.
- 2. At the top of the screen, enter your username and password and click Login.
- 3. Put your cursor over **Support by Product**.
- 4. Click **Documents**.
- 5. In the **Enter your Product Here** search box, type the product name and then select the product from the drop-down list.
- 6. If there is more than one release, select the appropriate release number from the **Choose Release** drop-down list.
- 7. Use the **Content Type** filter on the left to select the type of document you are looking for, or click **Select All** to see a list of all available documents.

For example, if you are looking for user guides, select **User Guides** in the **Content Type** filter. Only documents in the selected category will appear in the list of documents.

8. Click Enter.

Related links

Documentation on page 68

Training

The following courses are available on the Avaya Learning website at <u>www.avaya-learning.com</u>. After logging in to the website, enter the course code or the course title in the **Search** field and click **Go** to search for the course.

To earn the 3309 ACSS — Avaya Aura[®] Experience Portal with Avaya Proactive Outreach Manager Implementation and Maintenance credential, take these courses and exam:

Note:

Earning the certification is not mandatory. You can take the courses to gain knowledge about the product and need not take the exam.

Course code	Course title			
Virtual campus path:				
Implementation, Maintenance, Troubleshooting and Administration course:				
5C00040E	Knowledge Access: ACSS — Avaya Aura [®] Experience Portal with Avaya Proactive Outreach Manager			
The following administration course content is included in the 5C00040E. For administration only courses take the following:				
5C00020E	Knowledge Access: Avaya Aura [®] Experience Portal Administration			
5C00050E	Knowledge Access: Avaya Proactive Outreach Manager Administration and Configuration			
Traditional Training Patl	h: Implementation, Maintenance and Troubleshooting courses and exam:			
Avaya Aura [®] Experience Portal with Avaya Proactive Outreach Manager- Choose 5C00092I/V OR take the 4C00100I/V and 5C00090I/V courses:				
5C00092I	Avaya Aura [®] Experience Portal, Avaya Aura [®] Orchestration Designer, Avaya Proactive Outreach Manager Installation, Maintenance and Troubleshooting Essentials			
5C00092V	Avaya Aura [®] Experience Portal, Avaya Aura [®] Orchestration Designer, Avaya Proactive Outreach Manager Installation, Maintenance and Troubleshooting Essentials			
4C00100I	Avaya Aura [®] Experience Portal Implementation			
4C00100V	Avaya Aura [®] Experience Portal Implementation			
Implementation, Maintenance and Troubleshooting courses and exam:				
5C00090I	Avaya Aura [®] Experience Portal, Avaya Aura [®] Orchestration Designer, Avaya Proactive Outreach Manager Maintenance and Troubleshooting			

Course code	Course title	
5C00090V	Avaya Aura [®] Experience Portal, Avaya Aura [®] Orchestration Designer, Avaya Proactive Outreach Manager Maintenance and Troubleshooting	
Administration courses:		
4C00101W	Avaya Aura [®] Experience Portal Administration	
4C00074W	Avaya Proactive Outreach Manager (POM) Administration and Configuration	
To earn the 3309 ACSS —Avaya Aura [®] Experience Portal with Avaya Proactive Outreach Manager Implementation and Maintenance credential, take these courses and exam:		
😸 Note:		
Earning the certification is not mandatory. You can take the courses to gain knowledge about the product and need not take the exam.		
3309	Avaya Aura® Experience Portal with POM Implementation and Maintenance Exam	

Avaya Mentor videos

Avaya Mentor is an Avaya-run channel on YouTube that includes technical content on how to install, configure, and troubleshoot Avaya products.

Visit <u>http://www.youtube.com/AvayaMentor</u>.

To search for a specific product or topic, enter a key word or words in the Search Channel dialog box. To scroll though the posted videos, click the name of an item on Playlists.

Support

Go to the Avaya Support website at <u>http://support.avaya.com</u> for the most up-to-date documentation, product notices, and knowledge articles. You can also search for release notes, downloads, and resolutions to issues. Use the online service request system to create a service request. Chat with live agents to get answers to questions, or request an agent to connect you to a support team if an issue requires additional expertise.

Appendix A: Important test observations

To find out concurrent job capacity, performance testing was conducted on single zone setup using MSSQL Database with unlimited database connection.

Note:

This testing was conducted under lab conditions. Actual results on field may vary depending upon the customer environment.

The test system was configured as follows:

- A multi-POM single zone setup was configured on hardware servers in one LAN. Two POM servers were installed on primary and auxiliary Experience Portal Manager (EPM) servers with 4 Media Processing Platform (MPP) Servers and 4000 telephony ports configured. Two dedicated application servers were configured locally on separate servers. The hardware used for database server was HP DL360 Gen8 32 GB 2 CPU, 6 Core 2.3 GHz, Windows 2K8 Enterprise SP1 64 bit, SQL Server 2012 Standard Edition 64 bit. The hardware used for POM Server was HP DL360 Gen7 12GB Quad Core and 12GB. RHEL 6.5 64 bit. The hardware used for application servers was IBM x3550 M2 Server Quad Core with 8 GB RAM. The hardware used for simulators was HP DL360 Gen7 12GB Quad Core and 12GB.
- 2. 200 contact lists were created in the system. Total number of records imported in different contact lists were 1 million. Total number of contact attributes created in system was 200. The types of attributes were Phone, Float, String, Integer, Date, Timestamp, Boolean, Email, Long, Short, Character and Time. The contact lists which were used in running jobs had 100 contact attributes. The types of the associated attributes were 10 Phones, 2 Emails, 10 Floats, 10 Dates, 10 Integers, 1 Boolean and remaining attributes were of type String. The contact lists used in running campaign had 70% hit rate for live person with maximum header size of 1KB for 100 contact attributes. The 30% records were having completion codes such as Invalid Number, Network Refusal, and Call busy, ring no answer, and so on. 15 nightly imports were running with 10000 records in each import. 15 contact attributes were used for each contact in these imports.
- 3. The number of agent and campaign attributes created in the system was 25. These attributes were used in running jobs. The completion codes created in the system were 250 and 100 were used in running jobs. The agent addresses created in the system were 70, out of which 50 were used in running jobs. The outbound skills created in the system were 50.
- 4. The number of campaigns created in the system were 500. All concurrent jobs that were run had serial dialing enabled with hourly archival frequency and 50 attributes exported. All runs were run using 1 handler and 2-3 results processors. Average call duration was 1 minute with 70% hit rate for customer list. For agent based campaigns, the talk time was 1 minute
and wrap time was 20 seconds. No inbound traffic was running while these test were performed.

- 5. The number of agents logged in using in-house simulator in proxy mode was 1000. One or two manual agents were logged in using in-house sample desktop. Each agent had 2-3 skills configured on Communication Manager.
- 6. Agent Script was observed on manual desktop. It took 3-5 seconds to load the complete agent script for contact with 100 contact attributes configured.
- 7. Applications were configured using "Load Balancer" URI group on Experience Portal.
- 8. The following default settings were used in PIMHibernate.cfg.xml for database connections for respective POM Services:

PIMCD_Active">100</property>

PIMCD_Passive">10</property>

PIMCM">100</property>

PIMADMIN">100</property>

PIMAGT_Active">100</property>

PIMAGT_Passive">10</property>

- 9. POM purging feature was disabled.
- 10. This test was performed without enabling WFO for recording. The features like skill based pacing, agent blending were not used.
- 11. The **maxThreads** parameter in tomcat configuration was set to 500 on both primary and auxiliary EPM Servers.

No.	Agent Count	Job Count	Batch Size	% Avg CPU On DB Server	(%) Memo ry On DB Server	DB Open Conne ction	Max TPS Obser ved On DB Server	(%) Avg CPU On POM 1	(%) Memo ry on POM 1	% CPU On POM 2	% Memo ry on POM 2
1	1000	100	600	50	60	450	6250	45	42	22	55
2	1000	150	600	55	65	452	6120	22	61	60	47
3	1000	200	600	54	67	491	6320	25	63	54	64
4	1000	250	600	52	68	568	4097	32	68	61	50
5	1000	30*	600	51	68	489	7314	26	51	64	46
6	1000	200	600	55	68	517	3713	17	55	58	51
7	1000	150	1000	46	68	486	4392	17	57	56	42
8	1000	75	2000	50	68	427	5014	13	58	36	42

The following table depicts our observations for different tests run for 8 hours:

Table continues...

No.	Agent Count	Job Count	Batch Size	% Avg CPU On DB Server	(%) Memo ry On DB Server	DB Open Conne ction	Max TPS Obser ved On DB Server	(%) Avg CPU On POM 1	(%) Memo ry on POM 1	% CPU On POM 2	% Memo ry on POM 2
9	1000	50	3000	45	68	410	6430	11	61	29	49
10	1000	35	4000	50	68	370	4392	10	57	23	49
11	1000	30	5000	45	68	410	4096	9	58	25	50
12	0	50	600	45	69	542	2818	16	58.16	14	42
13	0	50	600	50	69	401	3474	15	57	31	41
14	0	50	600	40	69	351	3828	16	46	26	40

* 5 Call handlers used in campaign strategy per job.

😵 Note:

For all runs, MPP port utilization was observed up to 45-50% of total available 4000 ports.

Run	Total I	OB size increase for	the day	Remarks
	Db Size Before(GB)	Db Size After(GB)	% Increase	
1	67	67	0	No growth in GBs observed
2	120	142	18.33333333	18% growth observed
3	150	190	26.66666667	26% growth observed
4	190	212	11.57894737	11% growth observed
5	220	220	0	No growth in GBs observed
6	249	252	1.204819277	1% growth observed
7	262	268	2.290076336	2% growth observed
8	279	285	2.150537634	2% growth observed
9	287	294	2.43902439	2% growth observed
10	294	298	1.360544218	1% growth observed
11	298	305	2.348993289	2% growth observed

Table continues...

Run	Total D	Remarks		
12	339	339	0	No growth in GBs observed
13	339	339	0	No growth in GBs observed
14	339	339	0	No growth in GBs observed

Run1 on page 75 Run2 on page 77 Run3 on page 78 Run4 on page 79 Run5 on page 80 Run6 on page 82 Run7 on page 83 Run8 on page 85 Run9 on page 86 Run10 on page 88 Run11 on page 89 Run12 on page 91 Run13 on page 92 Run14 on page 94 Test for maximum temporary restricted contacts on page 95 Test observations on VMWare environment on page 96

Run1

Total 100 jobs with 25000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70 %. After 30-40 minutes, the database CPU utilization was around 50%. The average database memory was constantly at 60%. Different types of jobs were run, out of which 33% were of the Preview type, 33 % of the Predictive type, and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for the respective POM processes were:

- Total: 17385
- PAM: 299
- Campaign Director: 266
- Campaign Manager: 266
- ACTIVE MQ: 264

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 516
- Campaign Director: 907
- Campaign Manager: 733

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 85 and the percentage of SLA was 99. The percentage of unattempted records was 70%, and all jobs took more than 3 hours to stop completely. When jobs were terminated, there was 5-10% increase in POM server CPU and 3-4% increase in POM server memory. No CPU or memory increase was observed on the database server.



Figure 5: Open database connections for Run1



Figure 6: Transaction per second for database for Run1

Related links

Important test observations on page 72

Run2

Total 150 jobs with 25000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 55%. The average database memory was constantly at 65%. Different types of jobs were run, out of which 33% were of the Preview type, 33 % the Predictive type and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for the respective POM processes were:

- Total: 17570
- PAM: 313
- Campaign Director: 266
- Campaign Manager: 266
- ACTIVE MQ: 266

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 563
- Campaign Director: 120
- Campaign Manager: 623

All jobs ended using the time-based finish criteria. For agent based campaigns, the percentage of agent utilization was 89% and percentage of SLA was 99%. The percentage of unattempted records was 70%, and all jobs took more than 3 hours to stop completely. When jobs were terminated, there was 3-4 % increase in POM server memory and no increase in POM server CPU was observed. No CPU or memory increase observed on the database server.



Figure 7: Open database connections for Run2



Figure 8: Transaction per second for database for Run2

Related links

Important test observations on page 72

Run3

Total 200 jobs with 25000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 54%. The average database memory was constantly at 67%. Different types of jobs were run out of which 33% were of the Preview type, 33 % of the Predictive type, and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for the respective POM processes were:

- Total: 17186
- PAM: 309
- Campaign Director: 266
- Campaign Manager: 266
- ACTIVE MQ: 264

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 633
- Campaign Director: 225
- Campaign Manager: 782

All jobs ended using time-based finish criteria. For agent based campaigns the percentage of agent utilization was 90 and the percentage of SLA was 99. Around 60-70% records unattempted, and all jobs took more than 2-3 hours to stop completely. When jobs were terminated, there was 2-3 %

increase in POM server memory and 2-3% increase in POM server CPU utlization. No CPU or memory increase was observed on the database server.

Graphs for Run3 were not captured.

Related links

Important test observations on page 72

Run4

Total 250 jobs with 25000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 52%. The average database memory was constantly at 68%. Different types of jobs were run out of which 33% were of the Preview type, 33 % of the Predictive type, and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for the respective POM processes were:

- Total: 15517
- PAM: 310
- Campaign Director: 264
- · Campaign Manager: 264
- ACTIVE MQ: 268

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 707
- Campaign Director: 744
- Campaign Manager: 894

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 93 and the percentage of SLA was 99. Around 60-70% records were unattempted, and all jobs took more than 2-3 hours to stop completely. When jobs were terminated, there was 2-3 % increase in POM server memory and 2-3% increase in POM server CPU utilization. No CPU or memory increase was observed on the database server.



Figure 9: Open database connections for Run4



Figure 10: Transaction per second for database for Run4

Important test observations on page 72

Run5

Total 30 jobs with 25000 records per job and 5 handlers used in campaign strategy were started. For the first 15-20 minutes database CPU utilization was constantly above 60% with CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 51%. The average database memory was constantly at 68%. Different types of jobs were run out of which 33% were of the Preview type, 33 % of the Predictive type and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 17642
- PAM: 294
- Campaign Director: 438
- Campaign Manager: 438
- ACTIVE MQ: 269

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 694
- Campaign Director: 100
- Campaign Manager: 944

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 85 and the percentage of SLA was 99. The percentage of unattempted records was 40%, and all jobs took more than 1-2 hour to stop completely. When jobs were terminated, there was 1-2 % increase in POM server memory and 3-5% increase in POM server CPU utilization. No CPU or memory increase observed on the database server.



Figure 11: Open database connections for Run5



Figure 12: Transaction per second for database for Run5

Important test observations on page 72

Run6

Total 200 predictive jobs with 25000 records per job were started. The customer hit rate was around 70%. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 55%. The average database memory was constantly at 68%. The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 10633
- PAM: 307
- Campaign Director: 264
- Campaign Manager: 264
- ACTIVE MQ: 260

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 736
- Campaign Director: 538
- Campaign Manager: 747

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 84 and the percentage of SLA was 99. Around 10-20% records were unattempted, and all jobs took more than 1 hours to stop completely. When jobs were terminated,

there was no increase in POM server memory and CPU utilization. There was no CPU or memory increase observed on the database server.



Figure 13: Open database connections for Run6



Figure 14: Transaction per second for database for Run6

Related links

Important test observations on page 72

Run7

Total 150 jobs with 10000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 46%. The average database memory was constantly at 68%. Different types of jobs were run out of which

33% were of the Preview type, 33 % of the Predictive type and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 17686
- PAM: 293
- Campaign Director: 267
- Campaign Manager: 267
- ACTIVE MQ: 266

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 568
- Campaign Director: 207
- Campaign Manager: 572

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 89 and the percentage of SLA was 99. The percentage of unattempted records was 20%, and all jobs took more than 1 hour to stop completely. When jobs were terminated, there was 2-3 % increase in POM server memory and no increase in POM server CPU utilization. No CPU or memory increase was observed on the database server.







Figure 16: Transaction per second for database for Run7

Related links

Important test observations on page 72

Run8

Total 75 jobs with 10000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 80%. After 30 minutes, the database CPU utilization was up to 50%. The average database memory was constantly at 68%. Different types of jobs were run out of which 33% were of the Preview type, 33 % of the Predictive type and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for respective POM processes were

- Total: 11278
- PAM: 311
- Campaign Director: 264
- · Campaign Manager: 264
- ACTIVE MQ: 260

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 562
- Campaign Director: 211
- Campaign Manager: 580

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 90 and the percentage of SLA was 99. The percentage of unattempted records was 10%, and all jobs took more than 15 minutes to stop completely. When jobs were terminated,

there was 1-2 % increase in POM server memory and 2-3% increase in POM server CPU utilization. No CPU or memory increase observed on the database server.



Figure 17: Open database connections for Run8





Related links

Important test observations on page 72

Run9

Total 50 jobs with 10000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU was up to 45%. The average database memory was constantly at 68%. Different types of jobs were run out of which 33% were of the Preview type, 33 % of the Predictive type and 33% were of the Progressive type. The File

Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 11369
- PAM: 307
- Campaign Director: 264
- Campaign Manager: 264
- ACTIVE MQ: 260

No major increase observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 568
- Campaign Director: 565
- Campaign Manager: 572

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 89 and percentage of SLA was 99. The percentage of unattempted records was 10%, and all jobs took more than 15 minutes to stop completely. When jobs were terminated, there was 1-2 % increase in POM server memory and 1-2% increase in POM server CPU utilization. No CPU or memory increase was observed on the database server.



Figure 19: Open database connections for Run9



Figure 20: Transaction per second for database for Run9

Important test observations on page 72

Run10

Total35 jobs with 10000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 50%. The average database memory was constantly at 68%. Different types of jobs were run out of which 33% were of the Preview type, 33 % of the Predictive type and 33% were of the Progressive type. The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 11037
- PAM: 307
- Campaign Director: 264
- Campaign Manager: 264
- ACTIVE MQ: 260

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 413
- Campaign Director: 365
- Campaign Manager: 170

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 90 and the percentage of SLA was 99. The percentage of unattempted records was 10%, and all jobs took more than 15 minutes to stop completely. When jobs were terminated,

there was 1-2 % increase in POM server memory and 4-5% increase in POM server CPU utilization. No CPU or memory increase was observed on the database server.



Figure 21: Open database connections for Run10



Figure 22: Transaction per second for database for Run10

Related links

Important test observations on page 72

Run11

Total 30 jobs with 10000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. After 30 minutes, the database CPU utilization was up to 45%. The average database memory was constantly at 69%. Different types of jobs were run, out of

which 33% were of the Preview type, 33 % of the Predictive type and 33% were of the Progressive type The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 10971
- PAM: 307
- Campaign Director: 264
- Campaign Manager: 264
- ACTIVE MQ: 260

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 413
- Campaign Director: 365
- Campaign Manager: 170

All jobs ended using the time-based finish criteria. For agent-based campaigns, the percentage of agent utilization was 90, and the percentage of SLA was 99. The percentage of unattempted records was 10%, and all jobs took more than 15 minutes to stop completely. When jobs were terminated, there was 1-2 % increase in POM server memory and no increase in POM server CPU utilization. No CPU or memory increase was observed on the database server.









Important test observations on page 72

Run12

Total 50 notification jobs with 25000 records per job were started. For the first 15-20 minutes, there were database CPU spikes up to 70%. The average database memory was constantly at 69%. The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 19198
- PAM: 297
- Campaign Director: 266
- Campaign Manager: 266
- ACTIVE MQ: 260

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were

- Agent Manager: 507
- Campaign Director: 101
- Campaign Manager: 562

All jobs ended using the time-based finish criteria. The percentage of unattempted records was 10%, and all jobs took more than 15 minutes to stop completely. When jobs were terminated, there was no increase in POM server CPU utilization and in POM server memory. No CPU or memory increase was observed on the database server.



Figure 25: Open database connections for Run12



Figure 26: Transaction per second for database for Run12

Important test observations on page 72

Run13

Total 50 Email jobs with 25000 records per job were started. One way Email campaign strategy was created with 500 emails per hour. For the first 15-20 minutes there were database CPU spikes up to 70%. The average database memory was constantly at 69%. The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

• Total: 9419

- PAM: 301
- Campaign Director: 264
- Campaign Manager: 264
- ACTIVE MQ: 266

No major increase was observed in the file descriptor count.

The number of maximum threads generated for POM processes were:

- Agent Manager: 314
- Campaign Director: 107
- Campaign Manager: 201

All jobs ended using the time-based finish criteria. The percentage of unattempted records was 10%, and all jobs took more than 15-20 minutes to stop completely. When jobs were terminated, there was no increase in POM server CPU utilization and in POM server memory. No CPU or memory increase was observed on the database server.



Figure 27: Open database connections for Run13





Important test observations on page 72

Run14

Total 50 SMS jobs with 25000 records per job were started. One way SMS campaign strategy was created with time based pacing of 290 SMS per hour. For the first 15-20 minutes, there were database CPU spikes up to 70%. The average database memory was constantly at 69%. The File Descriptor count present on the system when jobs were stopped for respective POM processes were:

- Total: 15988
- PAM: 296
- Campaign Director: 266
- Campaign Manager: 266
- ACTIVE MQ: 260

No major increase was observed in the file descriptor count The number of maximum threads generated for POM processes were:

- Agent Manager: 313
- Campaign Director: 362
- Campaign Manager: 251

All jobs ended using the time-based finish criteria. The percentage of unattempted records was 10% and all jobs took more than 15-20 minutes to stop completely. When jobs were terminated, there was 5-6 % increase in POM server CPU utilization and 5-6% increase in POM server memory. No CPU or memory increase was observed on the database server.



Figure 29: Open database connections for Run14



Figure 30: Transaction per second for database for Run14

Important test observations on page 72

Test for maximum temporary restricted contacts

A test was conducted to find out maximum temporary restricted contacts after which system stopped dialing new contacts. The recheck interval was kept 1 minute in campaign strategy for the system to retry temporary restricted contacts. A notification campaign was run with different batch sizes and 2000 outbound ports.

Following table depicts the maximum number of contacts restricted, after which the system stopped dialing new contacts and continued retrying restricted contacts. These numbers were observed in lab environment, hence actual number on field may vary depending upon outbound ports, recheck interval, batch size, agent count, call duration, and so on.

No.	Number of Restricted Contacts	Recheck Interval (min)	Time after System stopped dialing new contacts	Batch Size
1	13009	1	9 minutes	5000
2	5645	1	7 minutes	1000
3	5370	1	4 minutes	600
4	4278	1	2.45 minutes	250
5	3706	1	2 minutes	100

😵 Note:

For this test, the POM server memory and CPU utilization was observed to be around 40%.

Related links

Important test observations on page 72

Test observations on VMWare environment

Performance test for POM was carried out on the VMware environment.

😵 Note:

This testing was conducted under lab conditions. Actual results on field may vary depending upon the customer environment.

The test system was configured as follows:

 A multi-POM single zone setup was configured on VMware servers. Two POM servers were installed on primary and auxiliary Experience Portal Manager (EPM) servers with 6 Media Processing Platform (MPP) Servers and 3000 telephony ports configured. Two dedicated application servers were configured on separate servers. MSSQL POM database server was configured on VMware.

VM	Allocated CPU	Allocated RAM	CPU Reservation	RAM Reservation
POM Server	24 vCPU	18 GB	25300 MHz	18 GB
DB Server	24 vCPU	32 GB	55200MHz	32 GB
MPP Server (500 ports)	16 vCPU	12 GB	36800 MHz	12 GB

The VMware footprints are as follows:

2. Under POM Zone configuration, Agent Manager configured of AuxEPM POM and Zone Campaign Director configured of PrimaryEPM POM.

- 3. 50 contact lists were created in the system. Total number of records imported in different contact lists were 2 lacks. Total number of contact attributes created in system was 25. The types of attributes were Phone, Float, String, Integer, Date, Timestamp, Boolean, Email, Long, Short, Character and Time. The contact lists which were used in running jobs had 15-25 Contact attributes. The contact lists used in running campaign had 70% hit rate for live person with maximum header size of 1KB for 25 contact attributes. The 30% records were having completion codes such as Invalid Number, Network Refusal, and Call busy, ring no answer, and so on.
- 4. The number of campaigns created in the system were 60. All concurrent jobs that were run had serial dialing enabled with hourly archival frequency and all attributes exported. For agent based campaigns, the talk time was 2-5 minute and wrap time was 30 seconds. Inbound traffic was also running while these test were performed.
- 5. The number of agents logged in using in-house simulator in proxy mode was 1000. One or two manual agents were logged in using in-house sample desktop. Each agent had 2 skills Configured on Communication Manager.
- 6. Applications were configured using "Load Balancer" URI group on Experience Portal.
- 7. This test was performed without enabling WFO for recording. The features like skill based pacing, agent blending were not used.
- 8. The maxThreads parameter in tomcat configuration was set to 500 on both primary and auxiliary EPM Servers.

Campaign	No. of Jobs	Hit Rate %	No. of outbound Agents	Attempts per hour	No. of Inbound Agents	Inbound BHCC
Progressive +Predictive	50	~70	1000	~48K	3000	24K

The following table depicts observations for this test run for 8 hours:

Agent Count	Job count	% CPU DB Server	% Mem DB Server	DB open connecti ons	%CPU on POM 1	%Mem on POM1	%CPU on POM2	%Mem on POM2
1000	50	40	52	321 (max 550)	30	20	30	35

MPP server recommendations

- For MPP, configure the Retention Period (days) appropriately from Home > System Configuration > MPP Servers > MPP Settings > Record Handling On MPP, to avoid MPP disk full issue.
- Plan for MPP reboot during maintenance period periodically.
- Ensure CPU and memory Reservation is properly configured for MPP.

If the HIT rate goes below 50%, then more resources of the POM database server are used due to increased dialing speed.

Related links

Important test observations on page 72

Glossary

ECR	Use Expert Calling Ratio for any type of outbound job when optimizing the use of agents during the job is important.
EPM	Experience Portal Manager is the Web interface used to access the functionality of Avaya Aura [®] Experience Portal.
Hit rate	The contact lists have customer numbers which POM dials. POM dials only the valid numbers or active numbers. For example, if out of hundred contacts, seventy contacts pick up the call or are valid numbers then the hit rate is 70%.
ТСР	Transmission Control Protocol is one of the core protocols of Internet Protocol Suite, the set of network protocols used for the Internet.
UDP	User Datagram Protocol is one of the core members of the Internet Protocol Suite, the set of network protocols used for the Internet.

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