

AdvOSS Provisioning Engine

PRODUCT DATA SHEET

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AdvOSS Provisioning Engine - Product Data Sheet

Table of Contents

1	AdvOSS Provisioning Engine.....	3
2	Business Use Cases:.....	5
3	Modules.....	7
3.1	Base Application Module.....	8
3.2	Network Element Admission Control.....	10
3.3	Orchestrator/Work Flow Processors.....	10
3.4	Bulk Provisioning.....	10
3.5	Distributed Transaction Manager.....	10
3.6	Replays & Roll back Manager.....	10
3.7	Rate Limiting.....	11
3.8	Audit Trails / Request Response Logging.....	11
3.9	Extra Communication Protocols.....	11
4	Integration Points:.....	11
4.1	CRM & Order Management System.....	11
4.2	Self care Portals.....	11
4.3	Billing Systems.....	11
5	AdvOSS SDP based Provisioning Architecture:.....	12
5.1	Enablers.....	12
5.2	Workflow defined in SCCXML.....	12
6	Key Benefits.....	13
6.1	Scalability:.....	13
6.2	Reliability:.....	13
6.3	Robustness:.....	13
6.4	Customizability:.....	13
6.5	Disaster Recovery:.....	13
6.6	Flexibility:.....	13
6.7	Resilience:.....	13
6.8	Speed:.....	14
6.9	Data Integrity:.....	14
6.10	High Availability:.....	14
6.11	Redundancy:.....	14
6.12	Security:.....	14

1 AdvOSS Provisioning Engine

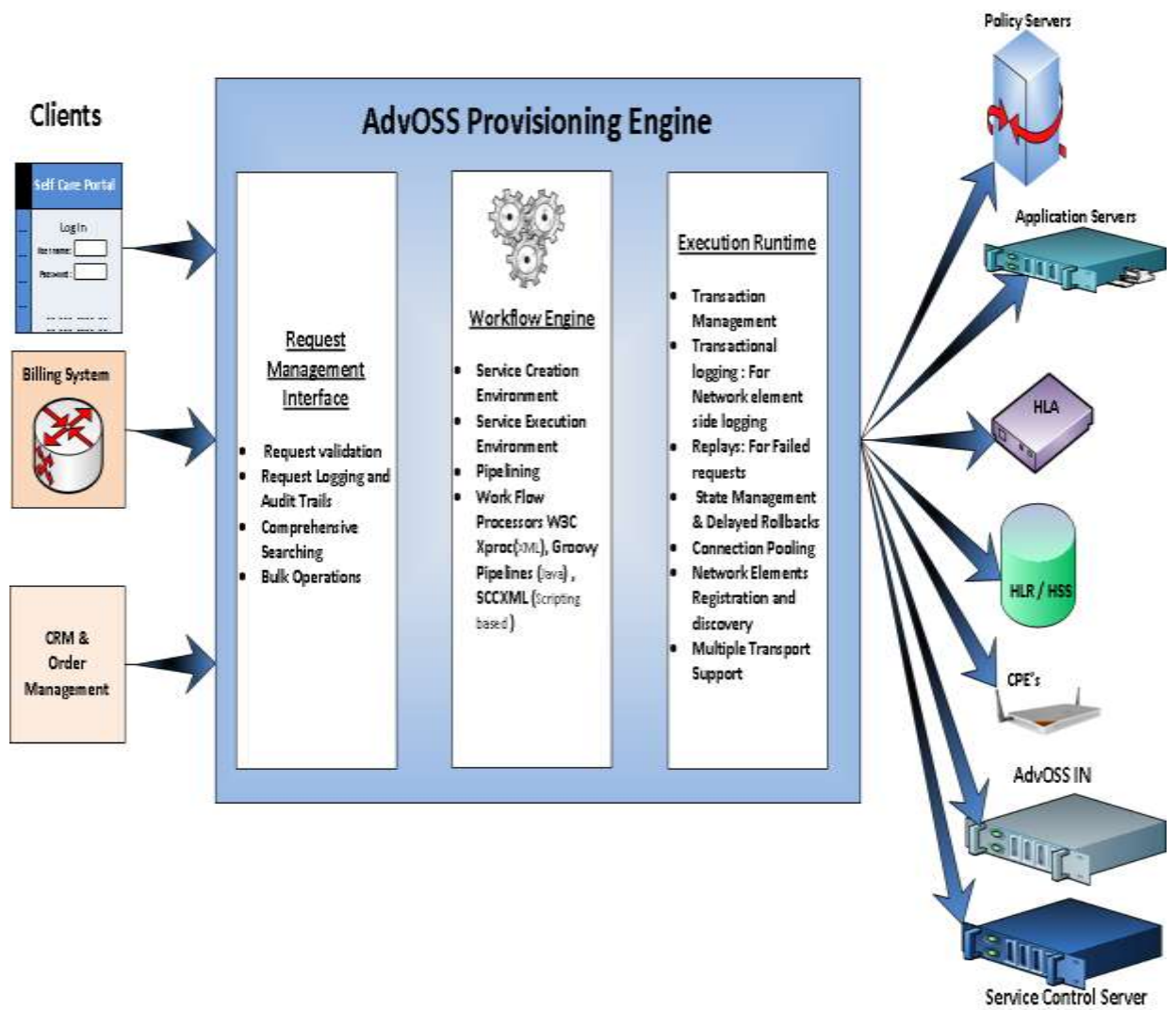
AdvOSS Provisioning Engine executes all changes on the network elements required for order fulfillment or service management purposes. It provides multiple transports to integrate with different types of interfaces. It can integrate with any work flow orchestration engine and includes three different types of orchestration engines. Provides complete input validation, audit trails, transactional execution, reporting and support for bulk operations

AdvOSS Provisioning System is a powerful next generation Provisioning solution for CSPs that enables quick activation of multiple services in an integrated manner across various technology domains.

AdvOSS Provisioning System is modular and flexible, to allow for incorporating provisioning logic specific to any kind of network resource whenever the need arises. It offers exceptional flexibility to CSPs to define and implement their Provisioning workflows using workflow processors such as W3C standard XProc (XML based), Groovy Pipelines (Java based), SCCXML based SDP (Scripting based) and others. AdvOSS Provisioning Engine acts as a layer that sits between the Clients and the Network Elements. It receives “Requests” from the Clients and executes them on Network Elements.


Architecture of AdvOSS Provisioning System is based on open APIs and hence can be easily integrated with other B/OSS products to build larger solutions. AdvOSS has a range of B/OSS products in its portfolio with which AdvOSS Provisioning System comes pre-integrated as part of AdvOSS Solution.

Network Elements




2 Business Use Cases:


- **Multiple Communication Protocols**
 - HTTP REST API (JSON/XML)
 - Socket (JSON/XML)
 - Web Service (SOAP/XML)


- **Client Authentication**
 - More details can be found from AdvOSS knowledge base article “Provisioning Engine Audit Trail logging” from here 


- **Input Request validation**

Details of API registration mechanism can be checked from AdvOSS knowledge base article “Network Element & API Registration & Discovery” from here 


- **Admission Control (North-bound)**

More details can be found from AdvOSS knowledge base article “Provisioning Engine-Admission Control & Rate Limiting” from here 

- **Invoking external Work Flow Processor**
 - XProc
 - Groovy Pipelines
 - SCCXML
 - Any third party work flow processor An in-depth understanding of the topic can be found from AdvOSS knowledge base article “Provisioning Engine – Workflow Processors” from here 


- **Calling south-bound work APIs**
 - More on this topic can be found from AdvOSS knowledge base article “Network Element & API Registration & Discovery” from here 

- **Request/Response Logging**


More details can be found from AdvOSS knowledge base article “Provisioning Engine Audit Trail & logging” from here 

- **Bulk Operations**

- Execution Schemes:
 - Immediate Execution
 - Manual Execution
 - Scheduled Execution
- Multiple data sources for Provisioning Batch (Bulk Operation) data submission.
 - XML
 - CSV
 - Excel Sheets
 - SQL Query
- An API URI has to be specified for which batch is being submitted for execution.


Further details can be found from AdvOSS knowledge base article “Provisioning Engine- Built-in Clients” from here 

- **Distributed Transaction Management**


More on this topic can be found from AdvOSS knowledge base article “Distributed Transaction Manager” from here 

- **Replays and Rollbacks**

- Request Replays
- Work Replays
 - Individual Work
 - Per Network Element

More information on this can be found from AdvOSS Knowledge base article “ProvisioningEngine-Replays & Rollback” from here 

- **Rate Limiting (South-Bound)**


More information on this can be found from AdvOSS knowledge base article “Provisioning Engine-Admission Control & Rate Limiting” from here 


- **Network Element Registration and Discovery**

More information on this can be found from AdvOSS knowledge base article “Network Element & API Registration & Discovery” from here



- **Periodic queue polling**

More information on this can be found from AdvOSS knowledge base article “Provisioning Engine- Built-in Clients” from here 

- **Scheduled Operations** More information on this can be found from AdvOSS knowledge base article “Provisioning Engine- Built-in Clients” from here 

- **Searching and BI**

- Provisioning Engine logs each activity (API call) going through it and hence provide Search and BI over detailed attributes list helping track and audit the network traffic.

- Following Attributes are available for Search and BI:

- Administrator
- Client IP Address
- Timestamps (Received/Executed)
- Network Element
- Specific API URI
- ReturnCode/ReturnString/Status
- XPath queries over actual Request & Response Data.

3 Modules

The AdvOSS Provisioning System is composed of the following modules:

3.1 Base Application Module

- **Client Authentication**

- **Network Elements Provisioning**

 - **Access Server Provisioning**

 - This module is actually an enabler component and supports provisioning of following two kinds of Access Servers:

 - Policy Servers
 - Subscriber Managers

 - **Application Server Provisioning**

 - This module is actually an enabler component and supports provisioning of following kinds of Application Servers:

 - Class 5 Soft switch
 - Support for different Class 5 soft switches is available:
 - Cisco BTS
 - Billing and IN Servers
 - Support for different Billing Servers is currently available:
 - AdvOSS Converged Billing Server
 - Oracle BRM
 - Web Servers

- **CPE Provisioning**

 - This module is actually an enabler component. It supports many Wimax CPEs out of the box. Support for new CPEs can be added as per CSP requirements. This includes following CPEs and more:

 - Motorola Buckeye CPEi600
 - ZTE IX380
 - Motorola Jupiter CPEo400
 - Motorola Wave2 CPEo450
 - Motorola Wolverine CPEi300
 - Motorola Blade2 WIFI CPEi35775
 - Motorola Blade2 CPEi35750
 - Motorola USBw35100
 - ZTE USB AX320

- **NE Registration and Discovery**

Provisioning Engine provides a flexible Java based plug-in architecture to design various types of network elements. With the help of such plug-able architecture it is possible to encapsulate the underlying communication protocol and on top of it expose Work API calls that can be called from external clients and work flow processors at north-bound without even dealing with the low level communication protocol.

- Provisioning Engine has a list of built in provisioning plug-ins e.g. Broadhop/Cisco BTS, Generic JDBC based Stored Procedure call plug-in etc.
- New plug-ins can be written following the standard architecture and can be registered in Provisioning Engine using its hot deployment features.
- Plug-in architecture allow implementing the auto discovery of the Work API calls as well. By default provisioning engine supports automatic discovery of plug-ins supporting JDBC/Stored Procedures and Web-Service WSDL files as their underlying transports.
- All Work/Work flow APIs whether auto discovered or defined manually need to be registered with provisioning engine before those are exposed to north-bound clients.
- An API is identified by a URI and is defined/registered with the help of its Request and Response XML XSD.
- Request/Response XSDs are used by provisioning engine to perform input/output validation of the API calls.
- **Work Execution Runtime**
AdvOSS Provisioning Engine executes the workflows. It provides Pipelining, error management and comes with many built-in reports which can be further customized as per CSP requirement.
- **Schedule job Manager and Quartz**
Provisioning Engine uses Quartz framework to perform different activities as cron jobs that includes:
 - Scheduled execution of Bulk provisioning Batches
 - Scheduled polling of event queues to perform event driven service provisioning. In such cases event's payload is handed over to a Work flow API that can consume and process the payload to form any other Work/Work flow API call to be executed via provisioning engine.
- **Web Service interfaces (SOAP/XML)**
- **OAMP Reporting**

3.2 Network Element Admission Control

- Provisioning Engine provides admission control settings for all the configured network elements. Operator can restrict the TPS allowed on any network element and it is automatically taken care of by queuing all the requests for the said network element by engine.

3.3 Orchestrator/Work Flow Processors

Provisioning Engine provides few built-in work flow processors such as XProc ([a w3c Standard](#)) and Groovy Pipelines (Groovy language external scripts). Both work flow processors help building synchronous orchestration model for work/work flow API calls that route through provisioning engine.

However Provisioning Engine technically supports any third party work flow processor which can call the provisioning engine work flow/work APIs exposed on provisioning engine's north bound communication protocols.

- i. W3C XProc (XML based)
- ii. Groovy Pipelines (Java based)

3.4 Bulk Provisioning

A very powerful and flexible bulk provisioning framework is available with following features, in addition to the features present in regular provisioning:

- i. Doing any kind of supported operation on any support resource in any combination
- ii. Takes input in the form of CSV files or MS Excel Sheets
- iii. This enables things like bulk top up , running different kinds of promotions , bulk addition , bulk deletion , bulk change , etc on any granularity
- iv. One clicks easy rollback of any bulk operation if the underlying resource supports rollback options.
- v. This is a very powerful and enabling tool at the disposal of CSP's operations personnel.

3.5 Distributed Transaction Manager

Distributed Transactions Manager, manages all transactions with a distributed transaction processor that works across network elements and successfully rolls back a transaction on all network elements if required.

3.6 Replays & Roll back Manager

Replays for Failed requests and for recovery and roll-back of failed provisioning operations. State Management & Delayed Rollbacks.

3.7 Rate Limiting

Support Rate Limiting configurations for South bound Network Elements.

3.8 Audit Trails / Request Response Logging

Comprehensive Audit Trail and Request/Response Logging.

3.9 Extra Communication Protocols

Support for extra communications protocols including

- HTTP REST API (JSON/XML)
- Socket (JSON/XML)

Provisioning Transports

- REST APIs
- SOAP/XML
- XML over socket
- SNMP
- JMS
- CORBA
- EJBs
- Database Stored Procedures and Queries

Client Facing APIs

- REST
- SOAP
- XML over Socket

4 Integration Points:

AdvOSS Provisioning System offers points of integration with the following systems:

4.1 CRM & Order Management System

AdvOSS Provisioning System integrates with CRM & Order Management Systems that are responsible for customer creation & management. AdvOSS offers its own CRM System as well with which AdvOSS Provisioning System comes pre-integrated.

4.2 Self care Portals

For self provisioning management, AdvOSS Provisioning Engine integrates with any Self care Portal. Self care portal could be end user subscribers, vendors, other b2b partners, franchisees, agents or others.

4.3 Billing Systems

AdvOSS Provisioning System can integrate with Billing Systems that are responsible for billing and revenue management. AdvOSS offers its own fully featured Converged Billing System as well with which AdvOSS Provisioning System comes pre-integrated.

5 AdvOSS SDP based Provisioning Architecture:

AdvOSS Provisioning System can enable CSPs to define and implement their Provisioning workflows using AdvOSS Service Delivery Platform (SDP) and has the following flexible architecture, in order to be future proof:

5.1 Enablers

Enablers are entities that plug into the main AdvOSS Provisioning System and contain resource provisioning specific logic. Each Enabler provides support for provisioning a particular resource or a class of resources, e.g. we could have an enabler that supports provisioning of a particular Network Access Server from a certain vendor. Alternatively we could also have an enabler that supports a class of Network Access Servers under which provisioning support for many different particular Servers from various vendors could be provided.

An Enabler is defined by the following:

- I. **Primitives:** Primitives are basic API building blocks exposed by an enabler, and can be called from the workflow. Primitives encapsulate the basic provisioning logic units exposed by the provisioning API of underlying resources to be provisioned. They are fixed and define the feature set offered by a certain version of an enabler.
- II. **Transport Binding:** Each Enabler offers a transport binding, over which it can communicate to a resource for sending resource specific provisioning commands. E.g. some transport bindings are as follows:
 - i. -XML over HTTP
 - ii. -SOAP
 - iii. -XML over sockets
 - iv. -Radius
 - v. -Diameter

Enablers are provided by AdvOSS for various resources and the set of enablers is continuously being updated. AdvOSS can offer specific enablers to meet the requirements of a CSP, on demand, if pre-existing set of enablers is not enough for a certain resource provisioning.

5.2 Workflow defined in SCCXML

AdvOSS offers its own proprietary scripting language called SCCXML (Service Creation and Control XML) through which particular provisioning workflow can be defined. A Workflow can call primitives from available Enablers in any combination, and pass them required parameters. The workflow defined in the XML, can be altered by CSP personnel themselves to suit their specific needs. This offers

tremendous flexibility in designing CSP specific workflows without the need to incur customization costs as happens in the case of closed provisioning solutions.

6 Key Benefits

AdvOSS Provisioning System offers the following key benefits to the CSPs, in addition to its feature set:

6.1 Scalability:

The System can scale linearly offering substantial advantages in terms of cost reduction and ease of scalability.

6.2 Reliability:

The system provides high reliability and ensure mechanism to avoid system downtime though fully redundant DB architecture

6.3 Robustness:

The system is very robust and keeps performing in the fact of errors.

6.4 Customizability:

The system is designed to allow for easy and rapid customizations as per CSP requirements, on demand.

6.5 Disaster Recovery:

The System can be deployed in two geographically distant data centers, for disaster recovery reasons. AdvOSS Database solutions provide real-time DB replication to remote slaves. This gives the remote location an almost real-time image of the live database and the system can fall back to remote location in a disaster situation.

6.6 Flexibility:

The system is service agnostic and has the architectural provision to support any business model. This allows for easy customizability to support specific requirements of a CSP.

6.7 Resilience:

The system works at high loads within its thresholds and gracefully keeps working by handling the situations even beyond the guaranteed thresholds e.g. by rejecting requests.

6.8 Speed:

The system guarantees high speed of operations and latency times associated with the operations.

6.9 Data Integrity:

The systems preserve the integrity and correct relationship of data in order to guarantee the correct behavior.

6.10 High Availability:

The system uses various techniques to ensure a high availability behavior.

6.11 Redundancy:

The system achieves redundancy through multiple methods like having database servers in active/active configuration. The database servers as well as the servers hosting the GUIs are hosted in geographically distributed data centers.

6.12 Security:

Powerful role based security is implemented in the AdvOSS Provisioning System GUI. Detailed Audit Trail and logging is provided by the system, in order to cater for security requirements.
