



Provisus™

Service Provisioning / Activation System

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White Paper

Provisus: The Revolution in Service Activation/Provisioning



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Executive summary

Provisus™ is Next Generation's Service Provisioning and Activation System. We say this because it is a new product in the telecommunication market which provides the service provider with traditional functionalities associated with generic provisioning Systems as well as many new features and a performance level that exceeds most of the industry leading products.

Provisus™ offers the most sophisticated package of functionality needed by telecom operators which is fast, flexible and designed to operate at a very low cost of ownership (TCO). In addition Provisus™ is future ready, engineered to allow a very smooth migration to 3G and emerging technologies.



Introduction

There are four broad categories of middleware: communication, data management, integration and platform middleware. Platform middleware is systems software that resides between the operating system (OS) and the business applications. Although Operations Support System (OSS) middleware includes components from all of these four categories, it is predominantly platform middleware.

The first computer based Operations Support Systems appeared on the market a few decades ago; during this period there has been an unprecedented change in both the hardware and the software technologies associated with computer systems and their applications. It is only in the last twenty years that we have seen significant effort devoted to the development of standards and technology that can be applied to the design of large-scale modular OSS systems needed to manage digital communication networks.

The real life Operations Support Systems (OSS) of this millennium are very complex. The OSS systems have been developed during the last 10-15 years, resulting in a situation where many service providers have multiple OSS applications and systems. These OSS systems are characterized by complexity and high operations and maintenance costs. One key reason for the complexity is that the OSS industry is suffering from the lack of strong standard interfaces, leading to costly one-to-one integrations between systems.

According to a recent Gartner analysis report [Gartner2003] the level of OSS systems integration costs are at a high level compared to hardware, software license, and service costs. In fact, for every \$3 spent in OSS, about \$1 is spent for systems integration. As an example, an upgrade in one system may lead to a significant total cost.

This is because many systems need to be at least tested, but perhaps also the data inter-exchange software needs to be upgraded due to the many interfaces between the systems. The question of standard interfaces is tightly related to the question of a standard industry architecture defining the basic OSS components and interfaces. A standard OSS architecture could (and should) be supported by software components: middleware. However, the OSS industry should not invent the whole middleware concept on its own; rather OSS middleware should be built on standard IT middleware (which provides, for example, messaging, data storage, security). The OSS industry should enhance this standard IT middleware with the OSS specific functionality such as network inventory and network management protocols and tools. This is especially important if and when telecom software shifts from in-house development to commercial applications.



The Challenge

IMS/NGN are the challenges which the operators have to face in near future and operators have to prepare themselves for these difficult and potentially very expensive challenges. Revenue generation of wireless operators through voice is now declining day by day due to arrival of cheap communication technologies like VoIP etc. Operators are now developing their strategies to earn through new fresh streams of revenue and they are now moving towards data and content based services which will increase their declining revenues. Moreover, with the kickoff of 3G in china, the problematic and severely delayed roll out of 3G networks has just started but operators have still to rely on the existing telecom networks to deliver their services to the subscribers.

The competition is fiercer among the operators as well as the solution providers. The winner in this competition will be the one who gears up with the pace of future development. Technology is changing with every passing instance and decision making for services of IT/Network operations has to be equally dynamic to maneuver successfully in business.

With this comes the bundle of requirements such as platform independence, reliability, high efficiency & cost effectiveness and smooth integratable Provisioning/Service activation. For this you needed dozens of different solutions from different companies. Now Provisus™ brings you an all in one solution. You can do all these tasks through one platform with easier use and efficient reliability & stability.



Provisus™ Overview

Provisus™ is a leading provisioning solution which provides all the service activation services in one place. The all in one solution feature gives Provisus™ an edge on the existing solutions. Other than this, Provisus™ brings with it features such as Platform Independence, Services Architecture and Activation logic Engine (ALE) which are not to be found anywhere else in one single solution.

Provisus™ is used for provisioning GSM/CDMA/WLL and wireless services on various network elements in a telecommunication network. Though each network element may have different processes for activating, deactivating, adding, removing and configuring the services, the Network Elements interface modules offers a uniform interface and command set, which is used to interface with various end-user applications such as billing & customer care etc.

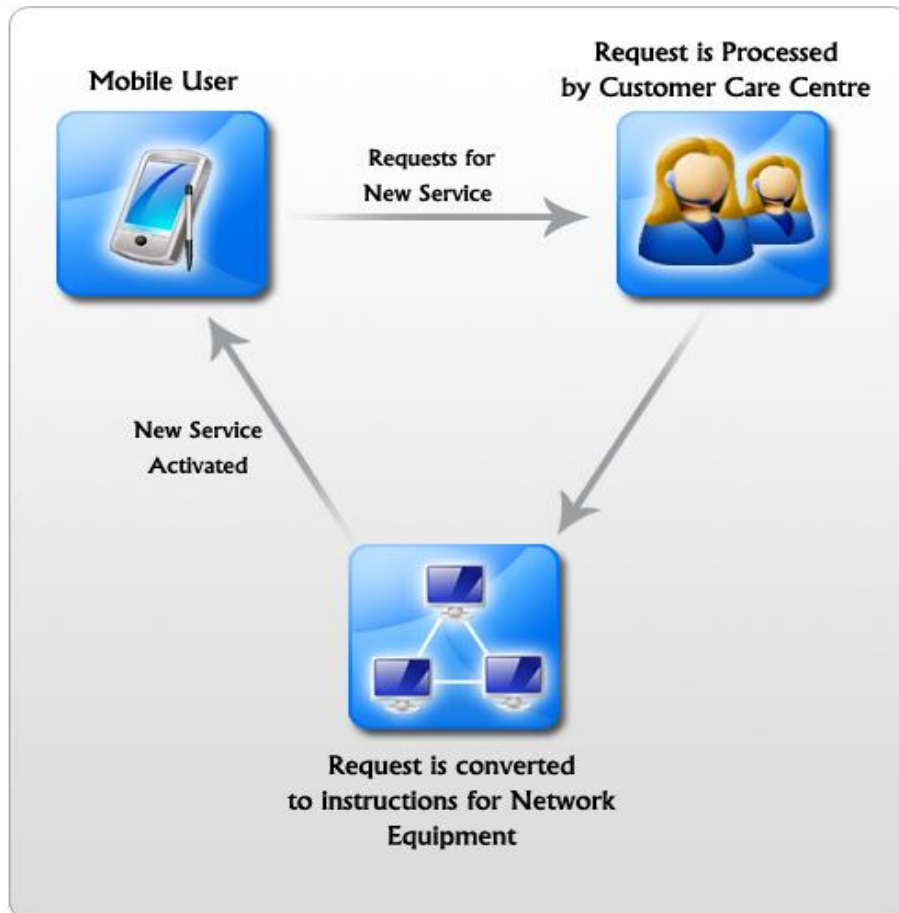


Figure 1 - Provisus™ Overview



Provisus™ Architecture

Provisus™ employs a state-of-the-art architecture exploiting class-leading features of Java and XML with Oracle as the central database for record-keeping. The Java clients run through any Java Virtual Machines and the Provisus™ application can run on any hardware platforms as the application is hardware independent.

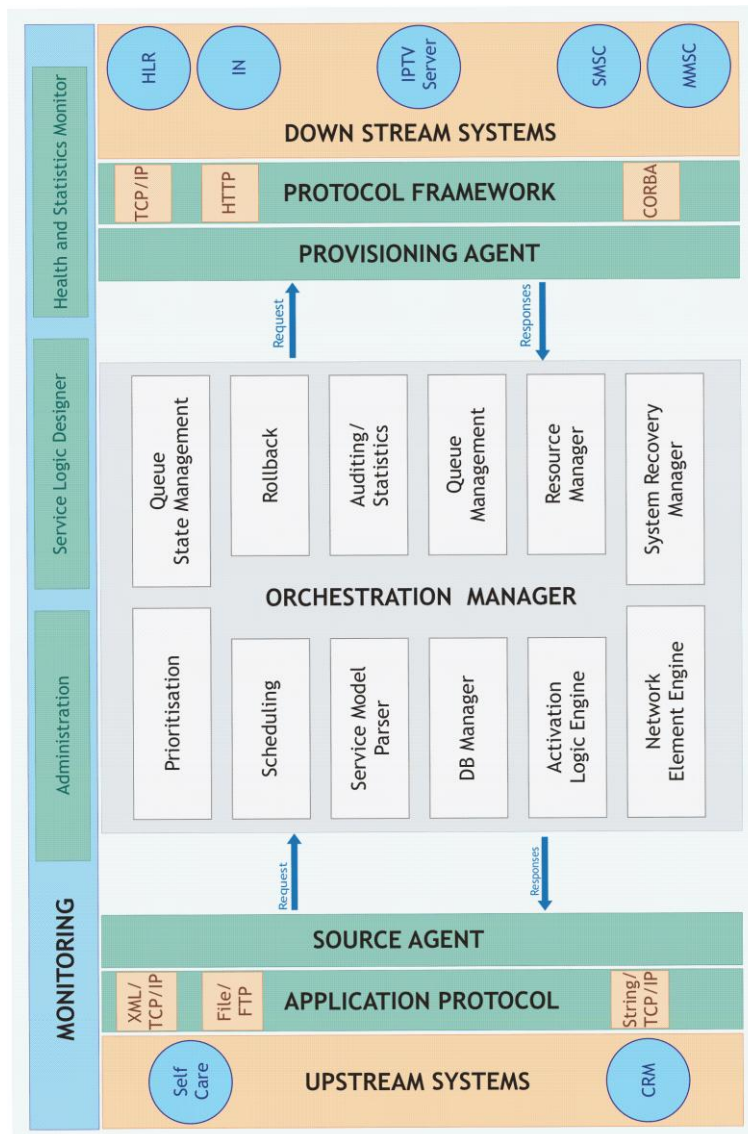


Figure 2 - Provisus™ Architecture



Provisus™ Functional Overview

Processing Requests

The processing entities of Provisus™ are responsible for fetching activation orders generated from the upstream systems such as CRM etc. These entities identify the type of activation order and then after processing them, generate a provisioning request based on the business logic defined for a particular operating environment. Once the information in the activation order is processed, these processing entities identify and forward it to the relevant network element with the help of the routing mechanism.

These processing entities are in fact the most important part of Provisus-Provisioning System™ as the business rules of an operating network are defined here. These entities in collaboration with the routing and response mechanism make sure that the provisioning request generated is reliably, efficiently and successfully provisioned on a network.

Routing Mechanism

The routing mechanism for Provisus™ is responsible for sending provisioning requests to the network elements. The mechanism maintains information about all the requests generated and their status. It makes sure that the information contained in these request is received by the relevant module which then further processed the information and converts it into an understandable format readable by the network elements. Once the network elements process the data, the information is then eventually routed back to the upstream systems with the result of the request. This unique feature makes sure that the requests are processed and forwarded to the network elements, thus increasing the efficiency of the system.

Response Mechanism

The response mechanism in integration with the routing mechanism maintains responses for the provisioning requests. Responses are generated once a provisioning request is passes a particular stage. These responses are maintained in different queues at different levels. Based on these responses Provisus™ takes appropriate actions according to the defined business rules in an operating network. A response tells whether the request has successfully cleared a particular level or not, thus providing real time monitoring capabilities.

This feature makes Provisus™ more reliable in terms of identifying errors occurred during the processing of requests, making it even more efficient than any other provisioning system.



Provisus™ Features

Provisus™ provides the following features in it which as compared to the other products in the telecommunication market provide increased efficiency and performance standards:

- Automated service activation processes
- Configurable business logic layer
- Configurable Database layer
- Library of pre-built OSS/BSS adapters
- Library of pre-built Provisioning agents
- Alarm and error monitoring
- Internal queuing logic
- Recovery and roll-back logic
- Sophisticated handling of device connections
- Full logging/auditing capabilities
- Full error-handling capabilities
- Real-time statistics/monitoring tool
- Prioritization/scheduling



Business Logic Offerings

The dynamic business logic of Provisus-Provisioning System™ makes it capable of integrating with any GSM, CDMA, WLL and wireless network operation environment. Provisus-Provisioning System™ provides easy to use interfaces for such purpose. A few of its features are:

- Java Libraries with pre-defined functions
- Interfaces to different modules of Provisus-Provisioning System™
- Interface to Database layer
- Flexible Database which can be modified according to business logic
- Interactive testing environment
- Validation of incoming Activation Order
- Utility framework for Activation Logic developer
- Translation of Activation order
- Reuse of pre-defined objects and libraries for reuse of activation rules
- Promotes re-usability of pre-defined business logic plans
- Employs full error-handling capabilities
- Uses built-in recovery and undo/rollback logic
- Enables “live swap” of business logic plans



Services Supported

Provisus-Provisioning System™ supports the following features, which enables it to support any GSM, CDMA, WLL or wireless network:

- Voice
- Data
- Content
- Messaging

Furthermore it supports the provisioning to following services:

- Creation of a new subscriber
- Modification
- Deletion of subscriber
- Suspending a subscriber
- Resuming a subscriber
- Activation of services
- Deactivation of assigned services

Other supported services include:

- Call hold facility
- Call waiting
- Call forwarding
- Call identification/restriction
- Call barring
- Missed call alert
- Conference calling
- SMS/MMS
- Fax/Data
- NWD/IDD/IR
- GPRS



Provisus™ Benefits

Provisus™ is a powerful solution that grows with the business need and customer requirements. It provides the required flexibility, scalability, and functionality in a high volume activation environment. Provisus™ offers the benefits listed below:

- Modular and flexible design to support multiple, heterogeneous applications Billing Systems.
- Supports multiple heterogeneous Network Elements (EIR, AUC, HLR, VMS, Pre-Paid, etc).
- Supports multiple protocols (CORBA, CMISE-Q3, RS-232, X.29/X.25 and TCP/IP) towards Network Elements.
- Centralized and network enabled, so that service provisioning applications can access Network Elements remotely for provisioning needs.
- Scalable to work with any number of billing systems, Network Elements and protocols.
- Customization flexibility.
- Well-defined security features to decrease unauthorized access.



Provisus™ Plus

To attract, retain and grow a healthy and loyal user community requires only one feature: operational excellence. If its achieved, all goals can be accomplished. Operational excellence can only be fulfilled when all participants in the service transaction can exercise control and influence in achieving their needs. Empowering subscribers by creating a more personalized and interactive user experience gives subscribers direct access to control, customize and personalize their services.

Provisus™ Plus enables service providers to create differentiated services utilizing the flexibility and configurability of a service management platform and infrastructure while retaining full operational control over service performance and usage. It also enables them to enforce centrally managed network and service policy over distributed policy enforcement points in the network in a reliable, scalable and efficient manner. This ensures that network resources are used in an efficient manner.

The unique product of Provisus™ Plus, provides a set of features bundled into a single package with which customers encompassing individual and corporate subscribers, can easily manage their subscriptions through a web interface. The introduction of these features allows operational excellence by reducing costs and on time service provisioning.

Provisus™ Plus User Groups

Provisus™ Plus offers the ability to control, customize and personalize subscriptions to Customers including:

- Individual Subscribers
- Corporate Subscribers
- Franchisees



Provisus™ Plus Modules

Provisus™ Plus consists of three modules to entertain the range of users

Provisus™ Personal:

A major percentage of an Operator's Customer base comprises of individual subscriptions. To manage these subscriptions, Operators have a need to establish call centers. Provisus™ Personal eliminates this factor by introducing a web interface to the individual subscribers. Every subscriber will be provided with an account to use the web interface from their homes. This interface enables the subscribers to control and customize the following features:

Check balance:

Subscribers can confirm their balances in the case of pre-paid connections from their web account.

Credit topup:

With this feature, subscribers can recharge their accounts through a secure connection.

Package conversion:

A subscriber can readily upgrade to new features.

Call Barring:

With this feature a user can suspend or resume his/ her account whenever required. When in case of traveling, the user can suspend his/her account and can resume it on return.

Access level (NWD, IDD, International Roaming):

The access levels can also be controlled via this interface

Call forwarding:

Call forwarding conditions and destinations can be changed according to the user's needs

Call waiting (busy, no coverage, no reply, switch off):

The subscriber can enable or disable this option through their web account

Voice Mail activation/deactivation:

Subscribers can activate / deactivate their voice mail service.

SMS activation/deactivation:

Subscribers can change their SMS service options.

MMS activation/deactivation:

Subscribers can modify their MSS service options.

GPRS activation:



With these feature, GPRS can be enabled or disabled at the subscribers discretion.

Parental lock:

The parental lock option enables the parents to exercise full control over the usage of their subscription. Features can be blocked and unblocked for certain durations according to their needs.

Web account management:

With this feature the user can customize their web account.

Change personal details:

The web interface enables personal details to be changed at the discretion of the user.

Change password:

Users can change their web account



Provisus™ Corporate:

An Operator's stability can be judged by its corporate accounts as it requires operational excellence. Provisus™ Corporate provides an edge to operators by taking operational excellence to a new level. By providing corporate users complete control over their account, an operator can enhance customer satisfaction.

The features being offered are:

Manage corporate accounts (CUG) :

Corporate subscribers can exercise full control over their account through Provisus™ Corporate.

Check balance:

Balance for pre-paid connections can be checked

Credit topup:

Accounts can be recharged through a secure connection

Call barring (Scheduling, Time based):

Subscriptions can be suspended or resumed at the subscribers discretion.

Package Conversion:

Conversions from pre-paid to post-paid and vice versa can easily be managed through this corporate user interface

Access level (IDD, NWD, International Roaming):

Access levels can be defined on individual subscriptions according to corporate policy

Call forwarding (busy, no coverage, no reply, switch off):

Call forwarding conditions and destinations can be changed according to the subscribers needs.

Call waiting:

The user can enable or disable this option through the corporate web account.

Voice Mail activation/deactivation:

Subscribers can activate / deactivate their voice mail service.

SMS activation/deactivation:

Subscribers can change their SMS service options.

MMS activation/deactivation:

Subscribers can modify their MSS service options.

GPRS activation:

With these feature, GPRS can be enabled or disabled at the subscribers discretion.



Web account management:

With this feature the subscriber can customize their web account.

Change personal details:

The web interface enables personal details to be changed at the discretion of the user

Change password:

Users can change their web account password at their discretion



Provisus™ Franchisee:

Provisus™ Franchisee provides a channel to all the dealers through which they can directly provision requests to the operator's network. By introducing this franchise management tool, its customers can enjoy quick service activations. The following features are offered in Provisus™ Franchisee:

Manage Dealer accounts (CUG):

Dealers can exercise full control over their account through Provisus™ Franchisee.

SIM replacement:

Dealers can provision SIM replacement requests through the Franchisee web interface.

Check balance:

Balance for pre-paid connections can be verified.

Credit topup:

Accounts can be recharged through a secure connection.

Call barring (Scheduling, Time based):

Subscriptions can be suspended or resumed at the user's discretion.

Package change (Conversion):

Conversions from pre-paid to post-paid and vice versa can easily be managed through this user interface.

Access level (IDD, NWD, International Roaming):

Access levels can be defined on individual subscriptions according to user's needs.

Call forwarding (busy, no coverage, no reply, switch off):

Call forwarding conditions and destinations can be changed according to the user's needs.

Call waiting:

The user can enable or disable this option through the Franchisee web account.

Voice Mail activation/deactivation:

Subscribers can activate / deactivate their voice mail service.

SMS activation/deactivation:

Subscribers can change their SMS service options.

MMS activation/deactivation:

Subscribers can modify their MSS service options.

GPRS activation:

With these feature, GPRS can be enabled or disabled at the subscribers discretion.



Web account management:

With this feature the user can customize their web account.

Change personal details:

The web interface enables personal details to be changed at the discretion of the subscriber.

Change password:

Subscribers can change their web account password at their discretion.



Glossary

Abbreviation	Meaning
CAPEX	Capital Expenditures
OPEX	Operating Expenditures
TOC	Total Cost of Ownership
GSM	Global System for Mobile Communications
CDMA	Code Division Multiple Access
OSS	Operation Support System
BSS	Business Support Systems
GPRS	General Packet Radio Service
XML	Extensible Markup Language
JVM	Java Virtual Machine
IMS	IP Multimedia System
NGN	Next Generation Networks
3G	Third Generation
HLR	Home Location Register
VLR	Visitor location Register
VMS	Voice Mail System
EIR	Equipment Identity Register
AuC	Authentication Center
VoIP	Voice over IP