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Table of Contents

Preface	3
Hardware and Software Requirements	4
Installation	6
1. System Concepts	7
Basic Information	8
PortaBilling Oracularius vs. PortaBilling.....	9
Oracle Licensing.....	11
What Does the PortaBilling Oracularius License Give You?	12
Scaling Up	12
2. Installation	13
Servers Installation and Interconnection.....	14

Preface

This document provides PortaBilling Oracularius users with information about system architecture, basic concepts, and other matters required in order to deploy it to manage and rate communication services.

Where to Get the Latest Version of This Guide

The hard copy of this guide is updated at major releases only, and does not always contain the latest material on enhancements occurring between minor releases. The online copy of this guide is always up to date, and integrates the latest changes to the product. You can access the latest copy of this guide at: www.portaone.com/support/documentation/

Conventions

This publication uses the following conventions:

- Commands and keywords are given in **boldface**
- Terminal sessions, console screens, or system file names are displayed in fixed width font



Caution indicates that the described action might result in program malfunction or data loss.

NOTE: Notes contain helpful suggestions about or references to materials not contained in this manual.



Timesaver means that you can save time by performing the action described in the paragraph.



Tips provide information that might help you solve a problem.

Hardware and Software Requirements

Server System Recommendations

- Nine (9) servers with Intel-based architecture, 64bit CPUs (Intel Xeon or AMD Opteron). Multi-core (or multi-CPU) servers are recommended – there is no licensing limit on the number of CPUs or cores. Each server should be equipped with a DVD drive (at least temporarily, during installation). Please also see the hardware requirements below:
 - Database servers (3 units):
 - At least 4 GB of RAM, 8-16 GB recommended.
 - Two network interfaces; at least one (used for cluster interconnect) should be Gigabit Ethernet.
 - If a disk array with fiber-channel connectivity is used for data storage, each server should be equipped with a fiber-channel adapter card.
 - At least 70 GB of local storage.
 - Billing servers (3 units):
 - At least 4 GB of RAM, 8 GB recommended.
 - Two network interfaces; at least one (used for cluster interconnect) should be Gigabit Ethernet.
 - At least 250 GB of available disk storage.
 - Web servers (2 units):
 - At least 4 GB of RAM, 8 GB recommended.
 - Two network interfaces; at least one (used for cluster interconnect) should be Gigabit Ethernet.
 - At least 250 GB of available disk storage.
 - Configuration server (1 unit):
 - At least 2 GB of RAM, 4 GB recommended.
 - Two network interfaces; at least one (used for cluster interconnect) should be Gigabit Ethernet.
 - At least 150 GB of available disk storage.
 - One USB port.

When choosing a specific server model, please ask your vendor about Linux compatibility.

- Shared disk storage for the Oracle database and other related data can be either direct attached storage, or a Storage Area Network (SAN). Please see the Oracle Verified configuration on the Oracle website for examples of supported storage solutions. A minimum of 500 GB of free disk space should be available.

For additional details and configuration advice, see the *Hardware*

Recommendations topic on our forum:

<http://forum.portaone.com/index.php?showtopic=3>

Client System Recommendations

- OS: Windows 95-XP, UNIX or Mac OS X
- Browser: Internet Explorer 6.0, FireFox 2.0 with JavaScript enabled
- Spreadsheet processor (MS Excel)
- Display settings:
 - Minimum screen resolution: 1024 x 768
 - Color palette: 16 bit color (minimum)

NOTE: To view downloaded CSV (Comma-Separated Values) files in Windows, please do the following to match the system's default list separator: My Computer -> Control Panel -> Regional Settings -> Number -> List Separator type ",".

Installation

PortaBilling Oracularius is provided on a jump-start installation CD. This CD contains installation media for Oracle Enterprise Linux, supplementary packages needed for convenient system administration and maintenance, and PortaBilling software packages.

PortaBilling Oracularius installation and configuration are automated and integrated with the main installation process. This allows you to install a completely functional PortaBilling Oracularius environment (all nine servers) from scratch in less than two hours!

For detailed installation instructions, please refer to the [PortaBilling Oracularius Installation Guide](#).

1 . System Concepts

Basic Information

Oracu... what?

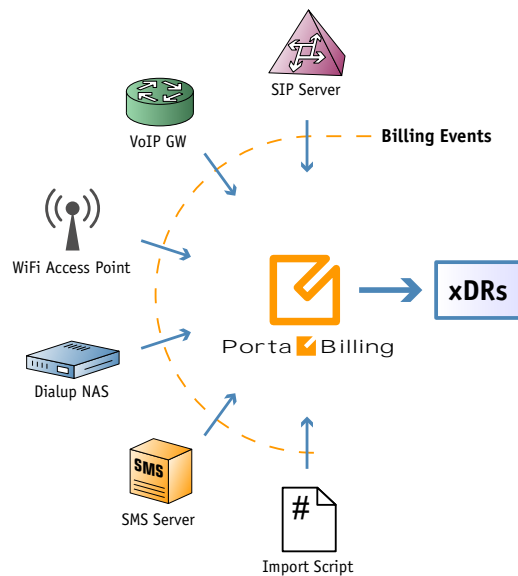
Oracularius is a Latin word; according to Webster:

1. Of or pertaining to an oracle; uttering oracles; forecasting the future; as, an oracular tongue.
2. Resembling an oracle in some way, as in solemnity, wisdom, authority.

Thus the name PortaBilling Oracularius signifies a tool that gives you the right answers about the future of your business. It also reflects the fact that it makes use of embedded technology from Oracle.

Purpose

PortaBilling Oracularius is a carrier-grade converged billing/provisioning system for communication services. It communicates with elements of your network (such as VoIP switches, IP TV streaming servers, or messaging gateways), provides these nodes with authentication or authorization (determining whether a customer should be admitted and provided with a service), and gathers billing events (i.e. data about services rendered to your customers). Based on this information, it performs rating for services, creates transaction records (also called xDRs - eXtensible Detail Records¹), and modifies customers' balances accordingly.



¹ The earlier term CDRs (Call Detail Records) is often used for xDRs for telephony services.

All this happens in real time, so that billing data is updated as soon as a session is completed (e.g. the customer hangs up his phone, or an SMS message is sent). PortaBilling Oracularius provides a unified platform for multiple services, which allows you to use it to charge clients for their voice calls, text messages, and data transfers, thus effectively deploying triple-play on your network.

PortaBilling Oracularius acts as the nerve center of your network. After you enter information about your services, rates, customers, and so on via the web interface, PortaBilling Oracularius communicates in real time with elements of your network to supply information regarding which customers a service should be provided to (and which not), as well as exactly how it should be provided. Customers whose balance has run out will be disconnected immediately after exceeding the maximum session duration and (because billing happens in real time) funds will be withdrawn from their account and service denied if they make another attempt to use the service.

PortaBilling Oracularius vs. PortaBilling

PortaBilling Oracularius provides exactly the same functionality as PortaBilling100 in terms of customer management, service provisioning, rating, billing, and so on. In fact, they share the same “core” functions of the billing engine, XML API, and other important modules. Also, their web front-end looks basically the same, thus significantly simplifying migration to PortaBilling Oracularius for current PortaBilling100 users.

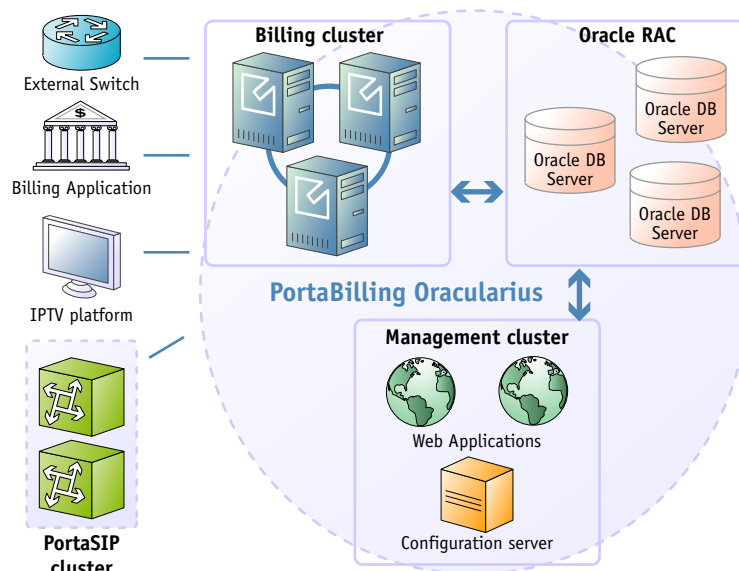
Therefore, in the rest of this document the term **PortaBilling** will be used to describe the general functionality shared by both products, while **PortaBilling100** or **PortaBilling Oracularius** will be used to refer to each specific product.

The fundamental difference lies in the architecture of **PortaBilling Oracularius**:

- The database back-end deploys multiple servers in the Oracle Real Application Cluster (RAC). This means that, in case one of the servers should fail, the database will continue to operate. Also, if more performance is required, additional servers may be added to the cluster to linearly increase capacity. For more details regarding the Oracle Real Application Cluster, see the [Oracle website](#).
- Similarly, the billing engine (the code that performs communication with the network, real-time rating, etc.) runs in a distributed fashion on several servers, which are organized as a

cluster. This provides fault-tolerance (if one of the servers in the billing cluster goes down, this does not affect the service provided to customers, since the remaining servers will carry on), and allows easy expansion of capacity by adding more servers.

- Administrative functions (administrator web, self-care web, XML API, etc.) run on several servers, enabling load-sharing and quick disaster recovery.
- Finally, there is a separate server which is used to maintain and manage the configuration of all the other servers. This greatly simplifies tasks such as adding a new server to your PortaBilling Oracularius installation, relocating components (e.g. one of the billing servers) to a new physical machine, or changing some other parameters.



Converged Billing

PortaBilling supports multiple services and service types. This means that as different types of services (e.g. voice calls, Internet access, WiFi connectivity and messaging) are provided to your users, PortaBilling collects data about all of them, processing and rating it according to the billing configuration. It then provides your customers with a consolidated bill, and your administrators with a unified customer management interface.

Billing Events

The main unit of billing information is a billing event – a notification that a service has been provided to a customer in the outside world, and that this customer should be charged for the service.

For many services (such as SMS messaging), a single billing event is represented by a single notification message to billing, while for others information about one event (e.g. a completed phone call) is split into multiple notifications from different network elements.

Oracle Licensing

PortaBilling Oracularius is supplied with an embedded licenses for all the necessary Oracle software – the Oracle Database Server Enterprise Edition (with Advanced Data Guard and Partitioning options) and the Oracle Real Application Cluster. This means that PortaBilling Oracularius covers the costs of both PortaOne-developed software and Oracle licenses, thus providing you with significant savings compared to the purchase of separate licenses directly from Oracle.

Just consider that for the standard installation of PortaBilling Oracularius, consisting of 3 database servers (each server containing two quad-core CPUs), you would need licenses for the Oracle Database Server Enterprise Edition, plus the Real Application Cluster and Partitoning option. The Oracle license costs in this case would be (number of servers) * (number of CPUs * (number of cores per CPU / 2)) * (license cost):

Licenses:

Oracle Database Server Enterprise Edition	\$47,500
Real Application Cluster	\$23,000
Partitioning option	<u>\$11,500</u>
<i>Subtotal:</i>	<i>\$82,000</i>

Multiplied by:

Number of servers:	3
Number of CPUs	2
Number of cores per CPU / 2	4/2

Total: \$984,000

The main limitation of these embedded licenses is that you, as the end-user, are not permitted to access data in the database directly (e.g. via a third-party reporting application), but rather only via the PortaBilling web interface or XML API.

If you need to integrate your own applications with the PortaBilling Oracularius database, you may want to consider purchasing the PortaBilling Oracularius Extra Edition, which includes bundled **Oracle** licenses. In this case, you are permitted to access the database directly. The only limitation here is that the database data must be used solely in connection with the PortaBilling application, e.g. you cannot create another database or new tables to store payroll data for your company.

What Does the PortaBilling Oracularius License Give You?

The PortaBilling Oracularius license entitles you to install and operate the following:

- 3 servers running the “billing engine” software package (RADIUS server, real-time billing engine, etc.).
- 3 servers running the database cluster software (Oracle database server, Oracle RAC and other database options).
- 2 servers for web administration, statistics calculations, XML API, and so on.
- 1 server for PortaBilling Oracularius configuration and management.

See the section below regarding extension possibilities for your PortaBilling Oracularius.

Scaling Up

The standard PortaBilling Oracularius installation includes three servers in the database cluster and three servers in the billing cluster. If more performance is required, you may purchase a “PortaBilling Oracularius Extra” bundle, which includes the license for a single billing server (to be added to the billing cluster) and a single database server (to be added to the Oracle database cluster).

If you wish to add more servers for web administration (e.g. a dedicated server for your end-user web self-care), no extra licenses are required. The only condition is that this server must be added to your existing PortaCare contract.

2. Installation

Servers Installation and Interconnection

Management Network

Each PortaBilling Oracularius server should be connected to the local management network, which is used by servers in the cluster to exchange information. Since this network will be used by Oracle RAC servers to exchange large portions of data, it must be Gigabit Ethernet.

Public Network

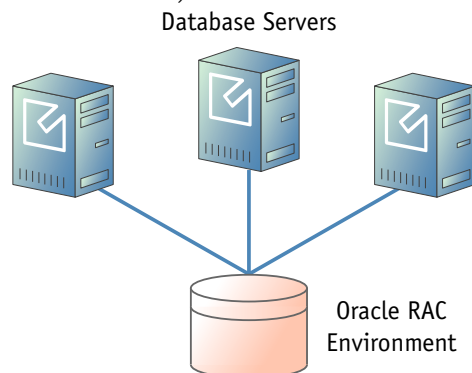
Each server will be connected to the public network. This is the network which provides a “real” IP address that can be used to access it via the Internet.

Do I need a firewall to protect my servers?

Each PortaBilling Oracularius server contains a built-in firewall and runs only those services which need to be accessed from the Internet (e.g. the web interface). So, strictly speaking, a separate firewall in front of the servers will yield little additional benefit. However, you may certainly use one if this is required by your security policies. Please consult the PortaBilling Oracularius Installation Guide for a description of which network ports should be open for each server.

Database Disk Storage

The Oracle RAC environment requires shared disk access, so that all the database servers have concurrent access to the same storage. The method of connecting storage to the database servers is usually either iSCSI or fiber-channel. (NFS options are not recommended, and therefore not covered here.)



In order to avoid a situation where disk storage becomes the single point of failure, it is recommended that you use several redundant storage arrays, connected via separate fiber-channel or network switches.

