EAGLE® XG Subscriber Database Server

Release 4.0 Feature Notice

910-6567-001 Revision A

October 2012

Notice

Information in this documentation is subject to change without notice. Unauthorized use, copying, or translation of this documentation can result in civil or criminal penalties.

Any export of Tekelec products is subject to the export controls of the United States and the other countries where Tekelec has operations.

No part of this documentation may be reproduced, translated, or transmitted in any form or by any means, electronic or mechanical, including photocopying or recording, for any purpose without the express written permission of an authorized representative of Tekelec.

Other product names used herein are for identification purposes only, and may be trademarks of their respective companies.

RoHS 5/6 - As of July 1, 2006, all products that comprise new installations shipped to European Union member countries will comply with the EU Directive 2002/95/EC "RoHS" (Restriction of Hazardous Substances). The exemption for lead-based solder described in the Annex will be exercised. RoHS 5/6 compliant components will have unique part numbers as reflected in the associated hardware and installation manuals.

WEEE - All products shipped to European Union member countries comply with the EU Directive 2002/96/EC, Waste Electronic and Electrical Equipment. All components that are WEEE compliant will be appropriately marked. For more information regarding Tekelec's WEEE program, contact your sales representative.

Trademarks

TEKELEC, EAGLE, G-Flex, G-Port, and CAMIANT are registered trademarks of Tekelec. The Tekelec logo, A-Port, EAGLE 5, EAGLE 5 ISS, IP7, IP7 Secure Gateway, V-Flex, ngHLR, BLUESLICE, and Subscriber Data Server (SDS) are trademarks of Tekelec. All other trademarks are the property of their respective owners.

Patents

This product may be covered by one or more of the following U.S. and foreign patents:

U.S. Patent Numbers:

7,155,206; 7,260,207; 7,650,367; 7,701,925; 7,738,488; 7,787,445; 7,848,767; 7,907,713; 7,933,608; 8,204,052; 8,238,884;

Foreign Patent Numbers:

EP 1269764; ZL 200780034932.6;

Table of Contents

List of Figures

List of Tables

Chapter 1

SDS

Topics:

This document includes feature descriptions, provides the hardware baseline for this release, and explains how to find customer documentation on the Customer Support Site.

Introduction

The Subscriber Database Server/Data Processor (SDS/DP) system consists of a Primary Provisioning Site, a Disaster Recovery (DR) Provisioning Site, and up to 24 DSR Signaling Site servers with redundant DP SOAM servers and up to 2 DP blades. Each Provisioning Site has an active/standby pair of servers in a high availability (HA) configuration and a third server configured as a Query Server.

The SDS/DP system is built upon the AppWorks platform, which provides the following services:

- Site-based GUI
- HA capabilities (active/standby switchover and DR switchover)
- Database functionality (replication, backup, restore)

This Feature Notice includes feature descriptions, provides the hardware baseline for this release, and explains how to find customer documentation on the Customer Support Site.

Feature notices are distributed to customers with each new release of software.

This Feature Notice includes the following topics:

SDS Hardware Configuration

SDS consists of an active/standby pair of subscriber database servers in an HA configuration, a third subscriber database server configured as a Query Server, an optional DR SDS, redundant DP SOAM servers, and up to 10 DPs (Database Processor) servers. An SDS system can have up to 24 sites, each capable of supporting up to 512 remote signaling points.

Table 1: Hardware Frame

Description	Function	Quantity	Notes
Cabinet with power, cabling, and aggregation switches	Frame	Minimum: 1 per site Maximum: 1	
HP BL460C G6 Blade Server	OAM Server	Minimum: 2 per site Maximum: 2 per site	One pair per site; provisioned as Active/Standby
	Data Processors (DPs)	Minimum: 1 Maximum: 10	

Description	Function	Quantity	Notes
HP C-7000 enclosure with switches	Houses the HP BL460C G6 blade servers	Minimum: 1 per cabinet Maximum: 1 per cabinet	
DL380 G6 Rack Mount Server (DC) or DL360 G6 Rack Mount Server (AC)	Management Server	Minimum: 1 per site Maximum: 1 per site	
HP DL460 Rack Mount Servers	SDS and Query Servers	Minimum: 2 per site Maximum: 3 per site	

Compatibility

The table below shows the compatibility of SDS with the releases of interfacing external systems.

Table 2: SDS 4.0 Compatibility with External Systems

Product	Release	Compatibility
DSR	3.0 and 4.0	Fully compatible

System Architecture

SDS consists of an active/standby pair of SDS servers in an HA configuration, an optional third SDS server configured as a Query Server, an optional DR SDS, redundant DP SOAM servers, and up to 10 DPs (Database Processor) servers. An SDS can have up to 24 DSR Signaling sites.

The SDS/DP software shall use the available AppWorks functionality.

This figure provides an overview of the SDS architecture.

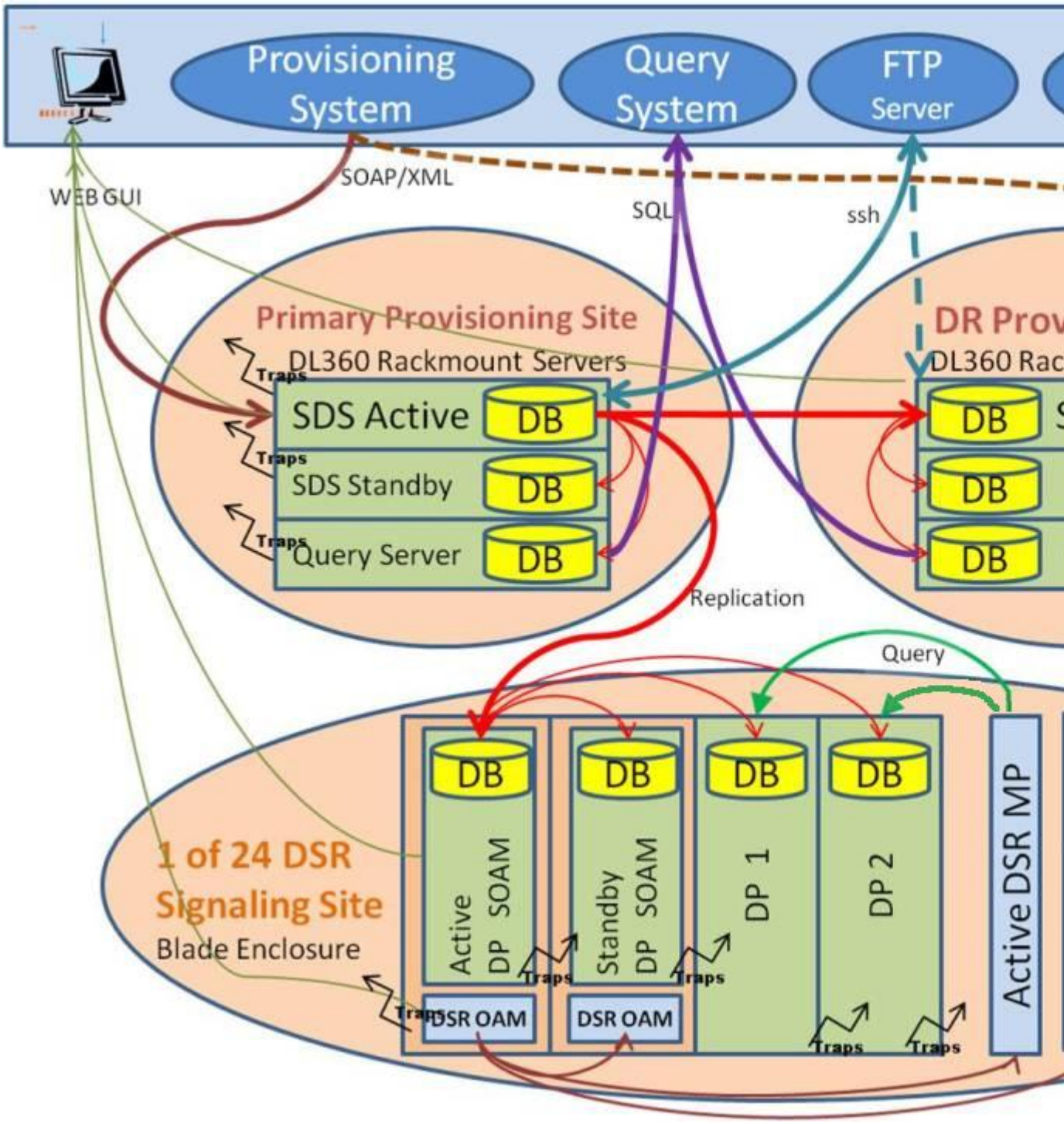

Figure 1: SDS System Diagram

This architecture includes the following components:

Primary SDS

The Primary SDS is one active and one standby HP DL 360 server running the SDS application and operating in a high availability configuration. It accepts subscriber data provisioned by the customer over SOAP or XML and replicates it to the DR SDS, the Query Server, and all underlying DP SOAMs. It also provides a GUI which is used for configuration, user administration, and the viewing of alarms and measurements.

The Primary SDS distributes all successful incoming subscriber provisioning data, independent of source, to all downstream Network Elements (NE)s and to the DR SDS at a rate of up to 200 provisioning database updates per second. In order to ensure the database levels of the Network Elements are no more than the database levels of the SDS and DR SDS, the active provisioning site SDS provisions the DR SDS prior to updating the Network Elements.

DR SDS

The DR SDS is a geographically independent SDS component. The DR SDS has the same hardware configuration and network accessibility as the SDS.

The DR SDS's databases are kept up to date through real-time replication of subscriber and application data from the Active SDS. Under normal operating conditions, the DR SDS does not provision any downstream systems but if made Active, it will take over all the functions of the Active SDS including the provisioning and database replication to underlying DP SOAMs.

DP SOAM

The DP SOAM is the combination of an active and a standby application server running the DP SOAM application and operating in a high availability configuration. It accepts subscriber data replicated from the Active SDS and in turn replicates it to all underlying DPs located in the same physical frame. The DP SOAM also provides a GUI used for viewing alarms and details specific to components located within the frame (DP SOAM, DP).

Each DP SOAM supports up to 10 DPs.

Query Server

The Query Server is an independent application server containing a replicated version of the provisioning database. It accepts replicated subscriber data from the Active SDS and provides a customer accessible MySQL frontend. A Query Server is located in the same physical frame as each SDS component (Primary SDS/DR SDS).

Network Element

Network Elements are containers that group and create relationships between servers in the network.

There are two types of Network Elements:

- SDS: such as the Primary SDS and the DR SDS
- DP SOAM: contains a pair of DP SOAM servers and one or more DP servers

The system can support two SDS Network Elements and up to 24 DP SOAM Network Elements.

DPs

The Data Processors (DP) are HP C-Class blades with the SDS application installed that are configured for DP functionality. They accept replicated subscriber data from the local DP SOAM and store it in a subscriber database.

The DPs are used for processing queries from the DSR Message Processor (MP) for destination address resolution. Each DP receives database queries that include user

identities such (MSISDN, IMSI or URI) and destination types and return the resolved destination's address FQDN and/or realm values.

Each DSR Signaling Site can support multiple DP servers deployed in a single frame in order to scale query capacity (by increments of 50,000 QPS per DP). Each DSR Signaling Site can support up to 10 DPs; however, only 2 DPs are supported in the initial release.

The DP servers all contain a copy of the same SDS data. They are configured in an active/active mode. The DSR's MP is responsible for load-balancing requests across DP servers.

At each DSR site, DP servers are deployed with n+m redundancy. Initially n=1 and m=1.

Chapter 2

SDS Features

Topics:

Central provisioning of FABR data is provided by the Subscriber Data Server (SDS) component. The SDS is deployed geo-redundantly at a Primary and Disaster recovery site. SDS connects with the Query Server, the DP SOAMs at each DSR site or a standalone DP site to replicate and recover provisioned data to those components.

PDBI relay via SDS for HLRR

The PDBI relay via SDS for HLRR feature allows you to provision MSISDN and IMSI routing entities with destinations that have an E.164 network entity value mapping and automatically send those provisioning commands from SDS to HLRR. The PDBA client (called pdbrelay) running on SDS connects to a remote PDBA running on the HLR Router NOMAP and relays provisioning commands to HLRR.

PDBI Audit of HLRR

The SDS – PDBI Audit of HLRR feature is a Remote Audit feature between the SDS and HLR Router databases.

The Remote Audit feature provides an on-demand ability to initiate an audit of the remote HLR Router provisioning database and flag differences between the SDS and the HLR Router databases. This provisioning database audit includes MSISDNs and IMSIs and their associated Network Entity address values, which are extracted from the Destination Map table.

When an operator submits an audit request on the SDS GUI maintenance page, a PDBI client (pdbaudit) connects to the local PDBA and to the remote PDBA running on the HLR Router system. It sends request commands to both PDBAs, compares the response data, and reports any discrepancies between the two databases. The operator can check the status and review the results of the audit on the SDS GUI status page.

Expanded Bulk Export Capability to include PDBI format

The SDS – Expanded Bulk Export Capability to include PDBI format feature allows you to export MSISDN and IMSI routing entities with destinations that have an E.164 network entity value in HLRR PDBI format. This export format allows you to transfer the exported file to your stand-alone HLR Router and then import the file into your HLR Router database.

Map Destination to HLR E.164 Address

The SDS Map Destination to HLR E.164 Address feature allows you to provision existing destinations with an E.164 network entity. This value should correspond to an existing HLR Router Network Entity value; however, there is no validation to ensure that this address value exists in HLR Router.

Online Help

The SDS provides context-sensitive online help documentation that can be launched from the application GUI. There are two ways to access the online help from the GUI:

- Click the Help link located in the application's Main Menu.
- Click the Help icon located in the top right corner of any GUI page. When you click the Help icon the online help will open to the section of the documentation most relevant to the current page.

For more information about the usage and organization of the documentation, see the Getting Started section of the online help.

Chapter 3

Tekelec Resources and Services

Topics:

Tekelec provides a number of resources for EAGLE XG DSR. These include the availability of product documentation online, customer training, and access to the Customer Care Center.

Customer Care Center

The Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Tekelec Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Tekelec Technical Assistance Centers are located around the globe in the following locations:

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

  1-888-FOR-TKLC or 1-888-367-8552 (toll-free, within continental USA and Canada)

  1-919-460-2150 (outside continental USA and Canada)

  TAC Regional Support Office Hours:

  8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

- **Caribbean and Latin America (CALA)**

  Phone:

  USA access code +1-800-658-5454, then 1-888-FOR-TKLC or 1-888-367-8552 (toll-free)

  TAC Regional Support Office Hours (except Brazil):

  10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

  - **Argentina**

    Phone:

    0-800-555-5246 (toll-free)

  - **Brazil**

    Phone:

    0-800-891-4341 (toll-free)

    TAC Regional Support Office Hours:

    8:00 a.m. through 5:48 p.m. (GMT minus 3 hours), Monday through Friday, excluding holidays

  - **Chile**

Phone:

1230-020-555-5468

- **Colombia**

  Phone:

  01-800-912-0537

- **Dominican Republic**

  Phone:

  1-888-367-8552

- **Mexico**

  Phone:

  001-888-367-8552

- **Peru**

  Phone:

  0800-53-087

- **Puerto Rico**

  Phone:

  1-888-367-8552 (1-888-FOR-TKLC)

- **Venezuela**

  Phone:

  0800-176-6497

- **Europe, Middle East, and Africa**

  Regional Office Hours:

  8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays

  - **Signaling**

    Phone:

    +44 1784 467 804 (within UK)

  - **Software Solutions**

    Phone:

    +33 3 89 33 54 00

- **Asia**

  - **India**

    Phone:

    +91 124 436 8552 or +91 124 436 8553

    TAC Regional Support Office Hours:

10:00 a.m. through 7:00 p.m. (GMT plus 5 1/2 hours), Monday through Saturday, excluding holidays

- **Singapore**

  Phone:

  +65 6796 2288

  TAC Regional Support Office Hours:

  9:00 a.m. through 6:00 p.m. (GMT plus 8 hours), Monday through Friday, excluding holidays

Emergency Response

In the event of a critical service situation, emergency response is offered by the Tekelec Customer Care Center 24 hours a day, 7 days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with the Tekelec Customer Care Center.

Customer Training

Tekelec offers a variety of technical training courses designed to provide the knowledge and experience required to properly provision, administer, operate, and maintain Tekelec products. To enroll in any of the courses or for schedule information, contact the Tekelec Training Center at (919) 460-3064 or E-mail `training@tekelec.com`.

A complete list and schedule of open enrollment can be found at `www.tekelec.com`.

Locate Product Documentation on the Customer Support Site

Access to Tekelec's Customer Support site is restricted to current Tekelec customers only. This section describes how to log into the Tekelec Customer Support site and locate a document. Viewing the document requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Log into the *Tekelec Customer Support* site.

   Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.
4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

Chapter 4

List of Acronyms

Topics:

This section lists acronyms used in this document.

Acronyms

This document uses some or all of the following acronyms:

DP - Data Processor

DR - Disaster Recovery

DSR - Diameter Signaling Router

FABR - Full-Addressed Based Resolution

FQDN - Fully Qualified Domain Name

GUI - Graphical User Interface

HA - High Availability

HP - Hewlett-Packard

IMSI - International Mobile Subscriber Identity

MP - Message Processor

MSISDN - Mobile Station International Subscriber Directory Number

NE - Network Element

NPA - Number Plan Area

OAM - Operations, Administration, and Maintenance

PDP - Permissive Dialing Period

QS - Query Server

SDS - Subscriber Database Server

SOAM - Signaling Operations, Administration, and Maintenance

SOAP - Simple Object Access Protocol

TCP - Transmission Control Protocol

TPS - Transactions Per Second

URI - Uniform Resource Identifier

VIP - Virtual IP Address

XML - eXtensible Markup Language