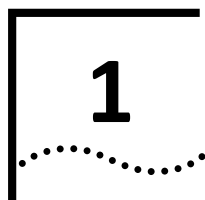




All-IP CDMA2000®
iCell® S-RAN System

S-RAN Release 2.x.x Guide

Part Number D02639GS



S-RAN SYSTEM OVERVIEW

This chapter provides an overview of the Star Solutions iCell® S-RAN SIP-controlled CDMA Radio Access Network. It contains these sections:

- [S-RAN System](#)
- [S-RAN Management Interfaces](#)
- [Call Flow Diagrams](#)
- [S-RAN Features](#)

S-RAN System

The S-RAN system includes S-RANs, 1xRTT BTSs, and a Provisioning Server, as shown in [Figure 1](#).

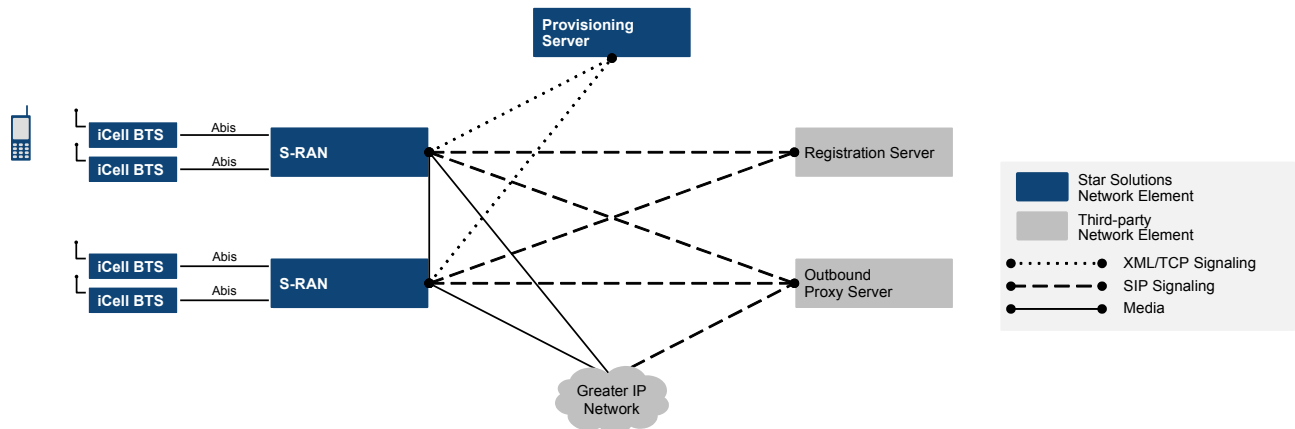
S-RAN S-RAN is a SIP-controlled CDMA2000 1X wireless access platform that runs on CentOS 5.1 and supports voice and data services. Its primary applications are in wireless access and wireless local loop service provision.

1xRTT BTS The iCell Base Transceiver Station (BTS) is a separate IP-based network element that the S-RAN controls. The BTS transmits and receives radio signals, providing wireless connectivity to Mobile Stations (MSs). One S-RAN system supports one to three BTSs.

Provisioning Server The Provisioning Server is a separate IP-based network element that acts as a centralized repository for user data. S-RANs request data from the Provisioning Server in order to register subscribers and complete calls.

The Provisioning Server runs on CentOS 5.1 and has dependencies on `libxml2`, the MySQL database management system, and the Apache HTTP server provided in CentOS 5.1. By default all are disabled, but the Provisioning Server installation enables and starts them.

Figure 1 S-RAN System Overview



System Function The Provisioning Server stores user data and regulates network access. Each user's profile indicates the SIP registration server (registrar) and SIP outbound proxy server (call manager) for the user's communications. S-RANs contact the Provisioning Server using proprietary XML/TCP signaling to retrieve user data.

For session control, S-RANs rely on the services of a SIP call manager. S-RANs use the Real-time Transport Protocol (RTP) for media transport.

S-RANs perform these functions:

- Interacting with a Provisioning Server to retrieve subscriber-specific data
- Interacting with registration servers and outbound proxy servers to set up voice over IP calls and send text messages using RFC 3261 SIP
- Coordinating soft and softer handoffs, allocating BTS radio channels to MSs, and managing transmission and reception over the air interface
- Connecting to Packet Data Serving Nodes (PDSNs) to enable data services.



SIP RFC 3261 support is subject to certain limitations. Refer to the most current S-RAN release notes document for details.

Optional Network Elements **Mobility Server**

The Mobility Server is an optional network element that provides SIP and IS-41 MAP interfaces, allowing the S-RAN system to interact with MAP-based network elements on the SS7 network. See [Chapter 5, IS-41 Mobility](#) for more information.

PDSN

A Packet Data Serving Node (PDSN) is an optional component of the S-RAN system. The PDSN enables mobiles to access IP networks directly by terminating their PPP sessions and tunneling their IP traffic to their Home Agents.

Required Third-Party Network Elements S-RAN interacts with SIP registration servers and outbound proxy servers.

Registration Server

A SIP registration server accepts SIP registration requests and adds the information contained in the requests to the location service for its domain. The location service is consulted to route SIP requests to the target SIP address of record.

When Mobility is enabled, the Mobility Server assumes the role of the SIP registration server.

Outbound Proxy Server

A SIP outbound proxy server handles all outbound service requests. The outbound proxy server is configured per subscriber using the [Subscriber Provisioning User Interface](#).

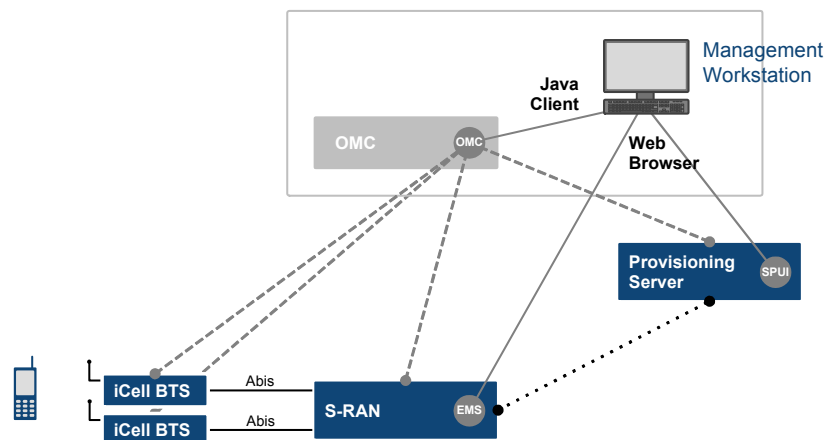
S-RAN Management Interfaces

Several interfaces are available for managing the S-RAN system:

- [Subscriber Provisioning User Interface](#), for subscriber and domain provisioning of the system.
- [Operations and Maintenance Center](#), for performance statistics and alarms monitoring of the Provisioning Servers, S-RANs, BSCs, and BTSs in the system.
- [S-RAN Element Management System](#), for managing a single S-RAN and the BSC and BTSs that support it.

These are shown in [Figure 2](#).

Figure 2 S-RAN System Management Interfaces



In addition, these interfaces provide direct access to the BSC and BTS Management Information Base (MIB):

- [Web-based BSC Management Interface](#), for managing a single BSC.
- [Web-based BTS Management Interface](#), for managing a single BTS.

Subscriber Provisioning User Interface The Provisioning Server hosts the Subscriber Provisioning User Interface (SPUI), a web-based user interface for subscriber and domain provisioning. SPUI provides for three levels of management:

- **System:** An S-RAN system is the broadest domain and consists of one or more enterprises, each of which consists of one or more user groups. The system administrator manages system-level network elements and services, the enterprises, and the enterprise administrators.
- **Enterprise:** An enterprise consists of one or more user groups. An enterprise administrator manages enterprise-level network elements, the user groups and services, and the user administrators.
- **User Group:** A user administrator manages the users, handsets, and services within a user group.

Refer to the *S-RAN System Provisioning Server Guide* for more information about SPUI.

Provisioning Server SNMP Daemon

The Provisioning Server SNMP daemon runs along with the Provisioning Server, enabling SNMP management of the Provisioning Server. The SNMP daemon processes requests from SNMP managers for data that is stored on the Provisioning Server.

The Operations and Maintenance Center is used to display the Provisioning Server's alarms, performance statistics, and operational/administrative status.

Operations and Maintenance Center The Operations and Maintenance Center (OMC) presents a graphical user interface that allows the user to view network alarms and performance statistics for Provisioning Servers, S-RANs, BSCs, and BTSs.

The OMC runs in a client-server configuration. The server runs on the Sun Microsystems Solaris 8 operating system; the client is a Java-based application launched from a web server on TCP port 6688.

See [Chapter 4, S-RAN Operations](#), for more information about the OMC.

S-RAN Element Management System The S-RAN Element Management System (SRAN-EMS) provides a web-based graphical interface through which operators can:

- View and change the status of S-RAN and all associated BSCs and BTSs
- Determine restart and operational / administrative status change times for S-RAN, BSCs, and BTSs
- Re-configure S-RAN, BSCs, and BTSs after initial setup
- Enable and disable the tracing of SIP messages incoming to and outgoing from the S-RAN and view the results

Service providers can use a web browser to view and change S-RAN administrative status, view status change history, and trace SIP messaging.

See [Chapter 3, S-RAN Configuration](#), for more information about the EMS.

Web-based BSC Management Interface The BSC contains an integrated HTTP server that provides a MIB-browser interface for configuration on TCP port 8888 by default.

Refer to the *iCell All IP Radio Access Network Operations and Maintenance Guide* and the *iCell All IP Radio Access Network Parameter Reference*.

Web-based BTS Management Interface The BTS contains an integrated HTTP server that provides a MIB-browser interface for configuration on TCP port 8888 by default.

Refer to the *iCell All IP Radio Access Network Operations and Maintenance Guide* and the *iCell All IP Radio Access Network Parameter Reference*.

Call Flow Diagrams

The call flows in this section cover these scenarios:

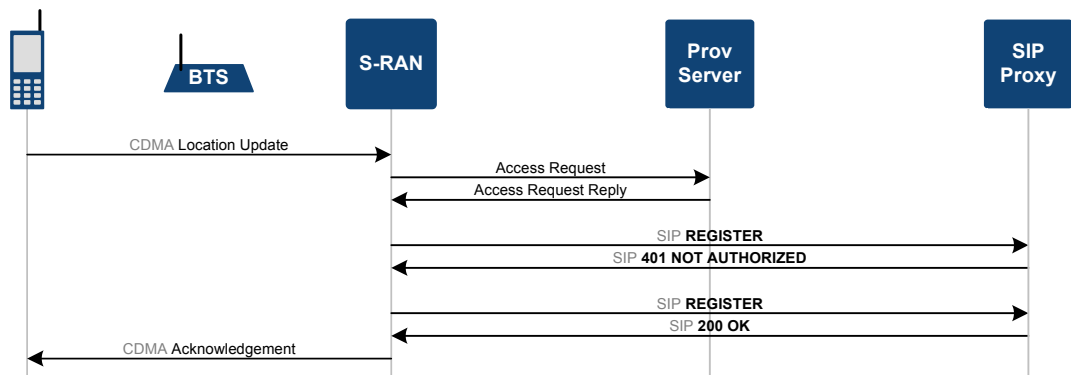
- [Registration](#)
- [Mobile Origination](#) (Voice)
- [Mobile Origination](#) (Text Message)
- [Mobile Termination](#) (Voice)
- [Mobile Termination](#) (Text Message)



In the diagrams that follow, the SIP proxy is assumed to host both a registration server and an outbound proxy server.

Registration [Figure 3](#) shows a mobile registration flow.

Figure 3 Registration Flow



Mobile Origination Figure 4 shows a mobile origination, voice call flow.

Figure 4 Mobile Origination (Voice) Call Flow

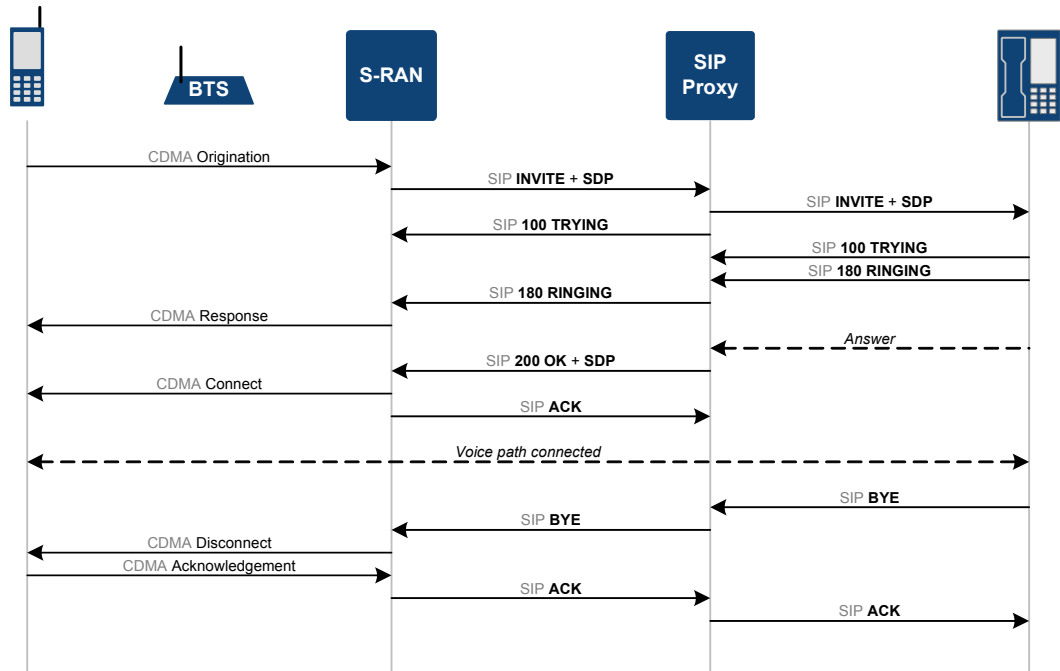


Figure 5 shows a mobile origination, text message call flow.

Figure 5 Mobile Origination (Text Message) Call Flow

