Space Link Extension (SLE)
CCSDS Protocol Services and Gateways

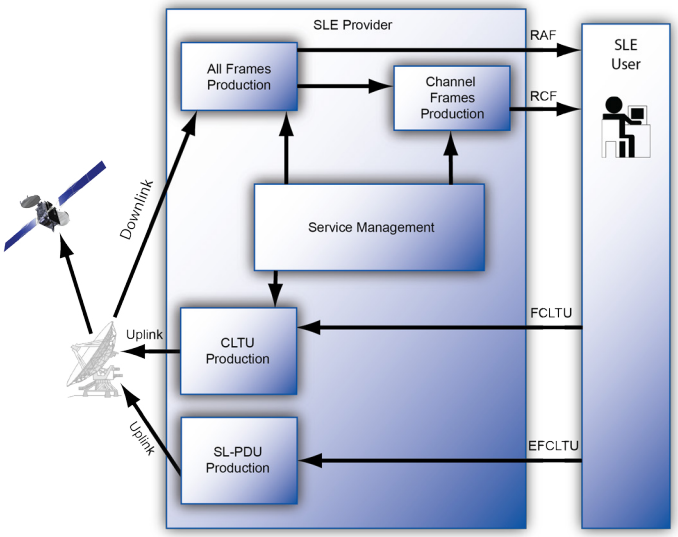
KRATOS | RT LOGIC

Overview

Kratos RT Logic Space Link Extension (SLE) protocol services enable Kratos RT Logic products to use the Consultative Committee for Space Data Systems (CCSDS) space-to-ground data constructs to move telecommand and telemetry data between various elements of satellite ground networks. Services are available to support both Provider side and User side edge devices implemented as either standalone systems or integrated with Kratos RT Logic modems and receivers. Telemetry downlink services include Return All Frames (RAF) and Return Channel Frames (RCF). These services support delivery modes of Timely Online, Complete Online and Offline. Command uplink services include Forward Command Link Transmission Units (FCLTU) and the Orange Book enhanced version (EFCLTU). These services can be combined with other optional functionality including best frame select, raw data recording and playback, and multi-modem uplink muxing.

Provider services can be delivered as integrated components within Kratos RT Logic's industry leading TT&C and high rate modems or as standalone edge devices that interface to other modems. User services can be delivered as software only virtual machines installed on customer supplied compute platforms or as standalone User side gateway devices. Both Provider and User side services are interoperable with any vendors User/Provider services that are in compliance with the CCSDS specifications.

SLE services are built on Kratos RT Logic's 4th generation Telemetrix architecture. This flexible architecture enables these services to scale to a wide range of customer missions from single stream, low rate, distributed provider services integrated with Kratos RT Logic modems to multi-stream (15+ service instances), high rate, centralized provider gateways operating on high end redundant servers.



- Data Rates 100+ Mbps (typical provider gateway platform)
- Proven Implementation, including:
  - AFSCN/USN Interoperability
  - NASA JSC FEPR SCP for ISS Telemetry
  - NASA Wallops LCS
  - SGSS
- Service Management Control and Status
  - Port Maps
  - Passwords
  - Service Instance Types and Settings
  - Status and Statistics
- Multiple Concurrent Service Modes
  - EFCLTU, FCLTU, RAF, RCF
  - Timely Online, Complete Online, Offline
  - Authenticate None, Bind, All
  - Bind Version Negotiation
- Customized Implementations for Customer-Specific Needs
  - Throw Events
  - Private Annotation Fields
  - Adaptation and Conversion Layers to support Non-Native Data Services

Features

Reference Specifications

CCSDS 911.1-B-2 Space Link Extension – Return All Frames Service Specification (RAF)
Blue Book. Issue 2. November 2004.

CCSDS 911.1-B-3 Space Link Extension – Return All Frames Service Specification (RAF)
Blue Book. Issue 3. January 2010.

CCSDS 911.2-B-1 Space Link Extension – Return Channel Frames Service Specification (RCF)
Blue Book. Issue 2. November 2004.

CCSDS 911.2-B-2 Space Link Extension – Return Channel Frames Service Specification (RCF)
Blue Book. Issue 4. January 2010.

CCSDS 912.1-B-2 Space Link Extension – Forward CLTU Service Specification (FCLTU)
Blue Book. Issue 2. November 2004.

CCSDS 912.1-B-3 Space Link Extensio
n – Forward CLTU Service Specification (FCLTU)
Blue Book. Issue 4. July 2010.

CCSDS 912.11-O-1 Space Link Extension – Enhanced Forward CLTU Service Specification (EFCLTU)
Orange Book. Issue 1. July 2012.

CCSDS 913.1-B-1 – SLE Internet Protocol for Transfer Services
Blue Book. Issue 1. September 2008.