EXS Call Control

Lucent Technologies
Bell Labs Innovations

To succeed in the competitive telecommunications marketplace, next-generation enhanced-service and infrastructure platforms must be flexible, programmable, scalable, and easy to use. These qualities translate into high-performance products that are cost-effective, robust and customizable, allowing carriers to get to market quickly with innovative services that help attract and retain subscribers. EXS Call Control was designed to address these needs, adding useful programming tools and powerful functionality to Lucent Technologies' award-winning switching architecture, the Expandable Switching System (EXS®).

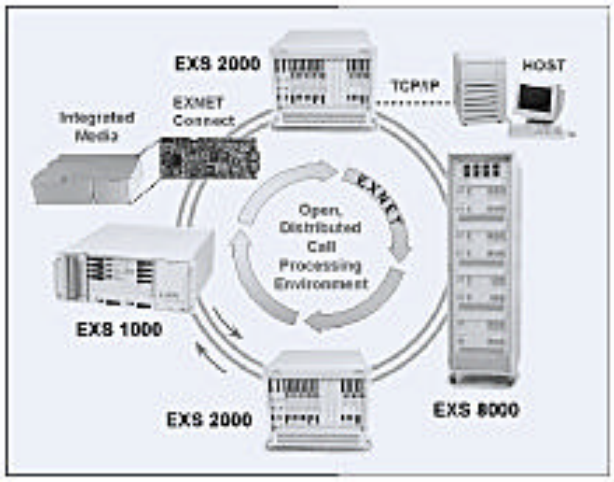
Flexibility, Functionality and Ease-of-Use

EXS Call Control is an **open, programmable call-control development environment** that allows the switch to perform many standard host-based functions, relieving the host of considerable processing and programming efforts that consume time and costs. EXS Call Control is based on Lucent's patented Programmable Protocol Language (PPL™) that reduces recompilation, regression testing and debug efforts. PPL provides easy-to-use, GUI-based state-machine tables that facilitate rapid system configuration and modification. EXS Call Control software resides on the matrix CPU and is configurable for 1+1 redundancy, supporting high reliability.

One of the many advanced features within EXS Call Control is the EXS Router, which provides programmability for internal routing and resource-group management. The Windows-based Route Configuration Tool allows users to easily modify routing tables, add additional tables, and download tables to the switch, all without interrupting service. Another feature, the Programmable API, allows modification of the switch Application Programming Interface (API) to mimic other APIs, which is useful when porting applications to EXS or implementing standards-based APIs such as S.100, TAPI or CSTA.

The Generic API can also off-load considerable processing from the host by enabling the switch to perform calculations and transport non-switch specific data. For example, time stamps for each call can be calculated by the switch; this relieves the developer of programming this process on the host. The Generic API also enables the switch to transport non-switch specific information that the host may need for call routing, such as identifying the incoming network. Off-loading these repetitive, process-intensive tasks from the host to the switch can significantly increase system performance and manageability.

A feature called Logical Switch Partitioning allows switch intelligence to properly distribute messages to applications. This enables the switch to support multiple hosts or multiple applications on one host,



Lucent's Expandable Switching System (EXS) provides an open, distributed, scalable and modular platform for EXS Architecture.

without programming host-level message distribution. Doing so can facilitate both reduced hardware costs and redundant host configurations. Added control of the switch call model also allows users to delete processes that may not be necessary for each application. This streamlines system messaging and efficiency.

EXS Call Control increases switch intelligence, considerably expanding its role in call processing. Now, the line between host and switch domain is flexible, allowing each system to be precisely optimized for the application. For example, a voicemail application deployed in different countries can be configured to change languages based on simple PPL modifications rather than modifying complex host codes for each deployment, resulting in time and cost savings. Additionally, PIN numbers for a prepaid application can go through call setup procedures in the switch, relieving the host of processing when PIN digits are entered incorrectly.

EXS Call Control is included in system software, however, using its advanced features is optional. In fact, users can precisely define which features to implement without affecting other processes that may remain on the host. For example, developers can use the internal routing capabilities without ever using resource group management services. Furthermore, EXS Call Control functionality also resides on each EXNET Connect card, adding this flexibility to integrated media resources.

Rapid, Efficient Call Control Development

The power of EXS Call Control can translate into numerous benefits for developers and carriers deploying Lucent-based platforms. EXS Call Control allows the switch to handle many programming-intensive functions, allowing them to be easily configured through GUI interfaces. This functionality reduces development time for implementing new applications, upgrades, customizations, and modifications. The results are reduced development costs and faster time-to-market. Use of EXS Call Control can also result in performance gains. Revenue potential can increase due to competitive advantages, such as increased flexibility and simple customization. Therefore, capitalizing on the strengths of EXS Call Control facilitates the creation of highly differentiated enhanced-service and infrastructure networks with the flexibility needed to adapt to the rapidly changing telecommunications environment.

Features

Internal Routing	Resource Group Management
Flexible Call Management	Multi-Host Routing
Call Model Control	Host Maintenance Mode(Graceful Transitioning Between Hosts)
Switch-Initiated DSP Management	Call Time Stamping
Generic API	Programmable API
Logical Switch Partitioning	

Routing Criteria

Time-of-Day	Day-of-Week
Week-of-Month	Called Party Address
Calling Party Address	Resource Group Routing
Fixed Routing	Multi-Criteria Routing (Combinations of the above)

Hunting Algorithms

Round Robin Clockwise	Round Robin Counter Clockwise
Sequential Top Down	Sequential Bottom Up
Least Recently Used	Most Idle without Normalization
Most Idle with Normalization	Alternate Odd as Defined in Q.70
Alternate Even as Defined in Q.704	

Lucent Technologies
255 Independence Drive
Hyannis, MA 02601
Telephone (508)862-3000 Fax (508)862-3155
www.lucent-ssg.com/ons

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