

The Living Systems® Connection Agent

Seamless Mobility at Work

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Abstract. The Living Systems®Connection Agent is a customizable client software that allows mobile operators and wireless Internet service providers to offer data services across different wired and wireless, own and partner networks. The technology offers seamless handover allowing mobile operators to converge different networks and simplifies usage of the software for the end-user.

1 A Seamlessly Mobile World

Contemporary mobile telecommunications users demand empowerment and rich interactive services as a matter of course. Not only this, but sessions must be as continuous as possible, providing a consistent experience by seamlessly adapting configuration according to available access technologies, device types and locations. A key component of this is the expectation of being always best-connected in terms of access to the maximum capacity on offer, the broadest selection of services, and of course for the least possible cost. This is a complex demand for providers to address, especially in the rapidly evolving telecommunications landscape where consumers are now commonly using always-connected multifunction mobile devices able to handle rich multimedia.

2 The LS/CA Solution

The Living Systems®Connection Agent, LS/CA, responds to these specific demands with a flexible, autonomic and customizable client software solution providing seamless vertical handover. The technology assists operators with converging their fixed and mobile networks and thus to provide their data services everywhere; to residential customers as well as to global enterprises, across different wired and wireless, own, and partner networks.

Presented at Kommunikation in Verteilten Systemen (KiVS'07) symposium, February 26 - March 2, 2007, Bern, Switzerland.
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Fundamentally, the LS/CA offers true *seamless mobility* that ensures the selection of bearer technology, such as GSM or WLAN, is optionally transparent to the user; preferences are simply expressed in terms of available services and the quality/cost levels at which they can be delivered. Seamless switching between any IP-network is achieved through Mobile IP, which assists with providing session continuity, allowing a client to maintain the same IP address for an entire session and applications to run uninterrupted.

Available networks are automatically detected and support for all major access network technologies is available, with new technologies added via a plug-in architecture as they become available. Secure communication is also supported via integration with multiple VPN clients and an optional standards compliant IPsec implementation for true end-to-end encryption.

The LS/CA user interface is designed to minimize user interaction, starting from straightforward single-click connection. Dropped connections are automatically re-established, with user intervention only required if the problem cannot be automatically resolved.

The first generation of the LS/CA product, called the Unlimited Data Manager (UDM), has been developed in partnership with Swisscom Mobile and is now in daily use by thousands of users throughout Switzerland. The UDM, marketed as Mobile Unlimited, won the 2005 GSMA international award for best mobile business application.

3 Autonomic Communications Management

As fixed-mobile convergence extends the service provisioning modalities available to users, it also creates a collateral growth in complexity, heterogeneity and dynamic behaviour which must be managed in the network, and at the user device. In this respect LS/CA is empowered with autonomic self-management capabilities that shift common configuration, maintenance and fault management tasks from users to the underlying technology itself.

LS/CA has a range of self-management features. *Self-configuration* capabilities allow the software to adjust its own configuration in accordance with changing network conditions and most importantly, to the working environment of the user. In this respect, policy controlled profiles are available for different locations which identify the configuration of features that can be used therein, e.g. connection type, VPN, file shares, etc. *Self-optimization* capabilities include the ability to select a connection type based on specified policies in accordance with changes detected in the environment. This is especially useful while roaming in partner networks where the nominal connection may not necessarily be the preferred, best or indeed cheapest option. The association with dependent applications can also be automatically optimized to, for example, compensate for temporarily lost or reduced bandwidth connections. The LS/CA also has several *self-healing* capabilities that allow automatic recovery from faults and failures with a minimum of impact on the user's experience. For example, detecting faults in related system components (e.g., network cards, drivers, system

interrupts) and transparently taking action to repair or circumvent the anomalous behavior. The LS/CA will also attempt to re-establish lost connections or, if not possible, seamlessly transition a session to an alternative connection type.

Fundamentally, the LS/CA is an assistive technology; it responds to the needs of users by simplifying tasks related to establishing and maintaining connectivity.