Lucent’s IMS Vision: Building a Services Enhancement Layer on top of the IMS Core Standards

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“Blended Lifestyle Services”

- IMS Core and Services Enhancement Layer
  - What and Why
  - Service Broker
  - Lucent Unified Subscriber Data Server (with Data Grid, Identity Management)
  - Vortex Rules Engine (and Policy Management Infrastructure)

- Summary
IMS enables a new ‘user-centric’ paradigm in the communication industry...

At home…

• Users will have ubiquitous access to all their services – independent of devices and different network types
• User will have more control - to different user personas, profiles and to personalize information
• The network will become more intelligent - capturing user context, location and more…
• Users will define their own experiences

Residential Domain

At work…

Blended Lifestyle Services:
• Useful combinations of services
• Can be realized on IMS in near-term
• Can increase network operator revenues

IMS enables a consistent user experience unifying domains, across different networks, user identities & applications

Consumers on the move…

Mobility Domain

Working remotely…

WiFi Domain

Enterprise Domain
Blending of IPTV and Call Control
Example: TV Caller ID

- Caller-ID information appears on TV Screen
- Options menu appears
- Using cursor controls on remote, highlight desired action
  - In this case, send call to voice mail
- Press OK on remote
  - Call is forwarded to voice mail system
  - Phone stops ringing
- Continue watching program.
  - Program could automatically pause while customer makes decision and automatically unpause when OK is pressed.
- Other scenarios
  - E.g., Video and data services blending
  - While watching a football game, customer could pause the game, then browse web page for game statistics
Blended Services Example: 
Active Phone Book

- Unified access to address book, buddy groupings
- Realtime presence, location, device capabilities for your buddies
- Personalization of presence/availability
- Click-to-call, Click-to-IM, etc
- Message waiting indicator

Market Research: Willingness To Pay for Active Phone Book is greater than Willingness to pay for Contact List + Presence + PTT
Lucent IMS Vision: Outline

- “Blended Lifestyle Services”

**IMS Core and Services Enhancement Layer**
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What the standards give us: The IMS Core

- Separation of signaling from bearer traffic
- Access-independent support for multi-media communication
- Componentized architecture enables extreme flexibility
- Easy to introduce new services

Lucent's IMS Vision, with Services Enhancement Layer
A Fundamental Shift in Telecom

- Traditional “legs” of telecommunications
  - Signaling
  - Bearer Traffic
- A new leg: **Context Data**
  - Dynamic: presence, location
  - More stable: Buddy phone numbers, buddy relationships, …
  - Interpretation of the data: combining context and preferences

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**Strong overlap with IT techniques** –
**But: Driven by Realtime, High Performance, Complex Sessions, Asynchronous Events**
IMS Core and Lucent’s Service Enhancement Layer

Presence and Location aggregated; can be “interpreted” according to user preferences via Vortex rules engine

Single point-of-access for (dynamic and static) subscriber profile data

A logically centralized database for subscriber-specific, applic-relevant data (including address books, buddy groupings, preferences)

Programmable component that coordinates services among distributed application servers, without having to change those servers

Lucent Extensible Client, that provides a platform for key IMS enablers and applications for the handset

Best-in-class Parlay/OSA-compliant gateway

Vortex rules engine, acting as a policy decision point, logically sprinkled throughout network.

AnyPath Unified Telephony Application Server 5000

Multi-media MiRingBack

Multi-party Gaming

Parlay/OSA Mediation

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Service Broker: Enabling rich service blends

- Controlling interactions has been very challenging
  - Services now in Application Layer
  - May have short-lived applications/application implementation
  - S-CSCF filter criteria do not support flexible interleavings of services
  - Mix of significant investment applications (e.g., TAS, messaging systems) and lighter weight varieties (new SIP app servers)

- **Service Broker will overcome these challenges**
  - May want blends to depend on presence information, location information, policy information, other network information
  - May want blends to depend on information obtained from web servers, IVRs
  - May want blends to depend on and influence Session Context

- Provides enriched end user experiences and new revenue opportunities

Service Broker can be used as a tool for enabling rapid deployment of new combinations of services in an IMS network
Service Broker: Blend Services Without Having to Modify Them

- Network operator can specify interactions between multiple Services
- Enables quick incorporation of new services, and creation of new service bundles for market segments

Lucent Enhanced Service Broker
- Application Interaction Management
  - Serial and parallel application invocation
  - Static and dynamic service logic
  - x-enables combined services (x is presence, policy, etc.)
- Experience Management
  - Maintains session level info, # and type of active links
  - Reliable, persistent, centralized control
  - Active, inactive, and multi-session awareness and control
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Managing Subscriber Profile Data: What is wrong with current mode of operation?

Today: Expensive to build new applications

- Costly to maintain (MxN connectivity)
- Time consuming to develop
- Difficult to share profile data between applications
- No common data schema
Tiered approach to User Profile Management

The User Profile Problem: No consolidated user profile

Telephony App Servers, Messaging, Customer Care, …

= Expensive to deploy new apps, due to:
  -- inflexibility of data
  -- inflexible service schema

Stand alone AAA servers = additional Opex costs
  + operational complexity

IMS deployment = Yet another set of User Profiles (the HSS)
Tiered approach to User Profile Management (cont.)

Solution to the User Profile Problem (part 1) - Centralized Database
- Common, distributed platform = Reduced Opex costs
- Unified User Database = Single user subscription & multiple profiles
  Useful in some circumstances (e.g., for HSS, end-user address book)

- Data Centralization
Tiered approach to User Profile Management (cont.)

The Lucent Data Management Solution - DataGrid
- Multiple databases easily accessible to any application
- Single point of access to data for applications
- Leverage data in legacy databases

Network Operator Domain

DataGrid

Centralized Database

DB

Ex: Telephony AS, VPN, Messaging, etc.

AnyPath

HSS

IMS

AAA

WLAN

Customer Care

Messaging

Apps

Data Federation (1)

Data Centralization
Tiered approach to User Profile Management (cont.)

ISP Domain

DB

Ex: AOL IM, Yahoo Calendar, etc.

Apps

Network Operator Domain

DataGrid

Centralized Database

DB

Ex: Telephony AS, VPN, Address Book, etc.

Apps

• Data Federation (2)

• Data Federation (1)

• Data Centralization

GUP

IMS

AnyPath

HSS

AAA

WLAN

Messaging

Customer Care
Two kinds of Centralized Profile Data:

Lucent’s SDHLR/HSS: Home Subscriber Server for IMS Networks

- **Fully Converged Subscriber Management Platform for circuit & IP networks**
  - Based on Lucent’s mature SDHLR platform: scalable, reliable
  - Unified subscriber profile data for multiple devices, including dual-mode handsets
  - AAA server capabilities for IP data networks: wireline, Wi-Fi, 1xRTT, EV-DO
  - Can support HLR/HSS functionality across wireline/wireless networks

**SDHLR: HLR & HSS**

- **IMS HSS PDLS**
- **Roaming SIP AS**
- **ANSI41 PDLs**
- **AAA Radius**

**Subscriber Application-Specific Info (SASI)**

- **Network-hosted store for application data**
  - E.g., address book, buddy groupings, preferences
  - This data might be used by multiple applications
    - E.g., buddy groupings for call notification/forwarding, IM, preference settings
  - Rich query access, e.g., LDAP, ODBC/SQL: more flexible than HSS standard
DataGrid in action

- Multiple, heterogeneous data “producers” (network components, and apps)
- Multiple data “consumers”, support for LDAP, ODBC, XML
- Unified schema based on Entity-Relationship model
  - More easily supports LDAP, relational, XML
- Data at Data Grid may be virtual, materialized, or “stream view”
Identity Management, LA and 3GPP GUP: Using and Going Beyond the Standards

Example: Giving wireless users a “zero-sign-on” experience

SP Admin Domain ← Service Bureau or Enterprise

SP and Service Bureau are in Circle of Trust
- SP network manages SAML tokens and acts as Identity Provider (IdP)
- Extensions useful for telecom
  - Managing multiple identities for an individual
    - e.g., personas, pseudonyms, randonyms
  - Personalized access control to profile data
    - Requester-targeted, context-aware, preferences-driven

IS: Identity Server Capability
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Vortex: What and Why

- Vortex is a policy management infrastructure
  - A rules language appropriate for telecom personalization and services enablement layer
  - A fast rules engine (decisions within a millisecond)

Ways to apply Vortex

- Personalization and ease-of-use for the end-user, e.g.,
  - Targeted interpretation of presence/availability
  - (Semi-)automatic management of location sharing permissions
  - Personalized feature interactions (e.g., call waiting vs. voicemail)

- Nimbleness for the network operator, e.g.,
  - Quick incorporation of new pricing policies in billing
  - (Frequent) tuning of access parameters in the MiLife ISG

Note: Vortex can be used as a tool for enabling rapid development and deployment of new capabilities in legacy networks
Policy Reference Architecture
(as found in, e.g., IETF and Parlay/OSA)

- **Policy Decision Point**
  - the component making the decision
  - the decision in itself does not have any impact or side-effect

- **Policy Enforcement Point**
  - the place in a component that enforces the decision
  - can be multiple Enforcement Points within a component

- **Policy Execution Point**
  - the place in a component actually performing the enforcement
  - (sometimes merged with Policy Enforcement Point)

- **Policy Repository**
  - the component storing the policies

- **Policy Administration Point**
  - for provisioning, checking policies

Separation of components forces
- Deliberate input/output perspective on decision requests
- Structured, more reliable use of policy engine
Friends Night Out Demo
Privacy-Conscious Personalization (PCP) Component

Michael
Acme Corp BLDG 1

Sally (non-employee)
Whippany
Wi-Fi @ Starbucks

Tom
Acme Corp BLDG 2

Michael’s activities:
• At work
• On Call
• In Meeting
• After Work

Presence/Availability
• Requester-targeted
• Context-aware
• Preferences-driven
The key to rich, flexible personalization: Apply the logic every time a request is made

- Vortex rules engine used to execute the decisioning logic
- Fast enough to include in call flows

Key Issue: Many applications, many different kinds of users

Vortex makes it cheap and fast to specify the different decisioning logic for diff apps and user segments
Vortex for Nimbleness: Policy-enabled SurePay

<< being productized >>

Wait till John sees this video clip!

Promotion for new users of video cell phones: 5% discount on all calls using > 30 seconds of video

Network Operator

Pre-pay billing policies can be modified in 2-3 weeks

Call Control

SurePay Billing System

Vortex Rules Engine

Requests

Decisions

5% discount

Vortex rules engine uses policy to combine variety of factors to decide
What promotions a call is eligible for
What is per-second charge for call currently in progress
Vortex for Nimbleness: Enhancing QoS in IMS with Vortex

<< exploration >>

**Load Balancing-aware QoS**
- Modify DO QoS parameters, e.g., codecs, bandwidth,
- Modify IP QoS parameters
- Incorporate SIP header info (desired bandwidth, priority,…), network load

**Subscriber and Application Specific QoS**
- Modify SDP parameters, e.g., desired bandwidth, priority,…
- SB knows all the AS’s
- SB or Vortex can access HSS, Presence Server
DB Mgmt and Policy Mgmt

- Separating the data/logic gives more flexibility, nimbleness
- Decisions with Vortex take about a millisecond (+ data access)
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Recap

- IMS standards: Revolutionary new flexibility in creation of telecom services
  - Access “independent”
  - Ease of incorporating new applications/services

- Lucent’s Services Enhancement Layer: Allowing SPs to take full advantage of IMS in cost-effective manner
  - Service Broker
    • Blend services and customize service interactions without changing the underlying application servers
  - Unified Subscriber Data Server
    • Enable applications to easily get end-user data and context
  - Vortex policy management infrastructure
    • Enables rich user-directed personalization of services
    • Gives network operator flexible control over traffic engineering

- Additional/Complimentary components
  • Presence/Location Server, IMS Extensible Client, AnyPath Messaging system, SurePay billing system, …