New Middleware Approaches for Ubiquitous and Mobile Solutions


Kazuo Asakawa
FUJITSU LABORATORIES, LTD.
Ubiquitous & Mobile Solutions
Dynamic Secure IP Roaming between locations

The Internet

Service Provider

ISP

Home

ADSL

WLAN

At Home

On the Road

2.5/3G

Non-IP Packet

VPN

Public WLAN

Enterprise Applications and Data

Ethernet

WLAN

WLAN for Visitors

At Home

The Internet

Dynamic Secure IP Roaming between locations

WLAN

Enterprise Applications and Data

Ethernet

WLAN

WLAN for Visitors

At Home

The Internet

Dynamic Secure IP Roaming between locations

WLAN

Enterprise Applications and Data

Ethernet

WLAN

WLAN for Visitors

At Home
Roaming between Intranet WLAN and Cellular Phone 1st step

Wireless LAN Access point AP

London
Berlin
Paris

In-house PBX
VoIP GW

In-house IP Back Born Network

Dual mode cellular phone

New York

Master DB

In-house – Directory – e-mail calendar

Mobile carrier
PDA

AP Beijing
AP Singapore

THE POSSIBILITIES ARE INFINITE
Roaming between Public WLAN and Cellular Networks

2nd step

Carrier D (issuing SIMs)
- HLR
- Subscriber exchange
- WLAN equipped composite card
- SIM Card
- SIM authentication flow for accounting
- WLAN
- Access Point
- Terminal
- Cross-media Retrieval
- Roaming seamlessly
- VPN
- ISP

Carrier K (providing roaming service)
- STP
- HLR
- Contents
- Firewall
- Subscriber exchange
- Application server
- Web server
- IP Core
- Photonic IP Network
- Traffic Engineering
- Blade Server
- Broadband Portal
- Security/Authentication
- Network Service Control

All Rights Reserved, Copyright © Fujitsu Limited. 2003
THE POSSIBILITIES ARE INFINITE
PCMCIA Type-2 Extended Card with a built-in IEEE802.11b Wireless LAN commercial product

Outward appearance

PHS P-in compact

SIM
Middleware for Ubiquitous deployment

◆ Realizing secure environments enabling mobile businesses with privacy protections
  • Hot spots coordination
  • Credit management services by Carriers and ISPs
  • SIM card incorporating a trusted engine
  • Attribute authentication using SIM cards
  • Contents protection by anti-tamper devices

◆ Network independent ubiquitous services
  eg. legacy mobile network v.s. IP network
  • Seamless IP roaming, location-oriented services and ad hoc community formation by software agents
  • Intelligent web crawler on meta-data retrieval
  • Customized services based on the profile matching
Seamless Service Coordination by Software Agents: **Interstage SeamlessLink**

- **Functionalities**
  - Sightseeing
  - Mail
  - Wireless LAN
  - Cellular Phone
  - Agent
  - VoIP/IM
  - Video/Music
  - Printing
  - Seamless Roaming
  - Navigation to the neighboring hot spot depending on the situation.
  - Service quality change depending on the situation.

- **Automatic plug & play of services that can be used in hot spots.**

- **Fujitsu Musium**

---

**All Rights Reserved, Copyright © Fujitsu Limited. 2003**

**THE POSSIBILITIES ARE INFINITE**
Hot Spot’s Services using SIM card

Offering available services corresponding to the user’s attributes on the SIM card

- Defining what services are available for what attributes by the policy
- Providing automatic service plug-in & plug-out with software agents

Service Plug & Play

SIM card (Company A: attribute) → Service 1

SIM card (Company B: attribute) → Service 2

Person C: attribute → Service 3

Condition for utilizing services (policy)

Company A: attribute

Company B: attribute

Person C: attribute
Profile matching on the Semantic web
- Providing the suitable knowledge to the occasion, place, etc.
- Filtering the meaningless information

Developed technology
- Profile (metadata) extraction
  - User profiles: Keyword extraction from personal documents
  - Project profiles: Extract business categories
  - Contents profiles: Keyword extraction, automatic categorization
- Profile matching: Interstage Cradle
- Intelligent Web Crawler: Interstage TerraCrawler
Intelligent Web Crawler: TerraCrawler

A Web documents analysis environment for Internet contents services
Features: Automated Web Contents analysis technologies
Services: ValueContents, Web/DB Contents Services, BBS Watch
Monitoring of Web BBS

Internet/Intranet

Intelligent Web Crawler

Web Archive

>300 million URLs

Link analysis
Information extraction
automatic classification

Time series monitor

Filtering

Monitoring

Search engine

Portal, EIP

Web metadata

Secondary information

Automated Web Directory

Web site monitoring

All Rights Reserved, Copyright © Fujitsu Limited. 2003
THE POSSIBILITIES ARE INFINITE
**CRADLE** - CorRelAtion Discovery and Learning Engine -

**Feature of CRADLE**

- Powerful recommendation
  - High performance and high accuracy by integrating profile matching and correlation matching technologies
- Useful decision support function
  - Presentation of reason why this content is recommended

**Commercial Product**

Personalization engine: Interstage Contentwiz  FUJITSU Middleware Product for Content Integration

**Application Case**

Beauty Counselor  BC Knowledge System

**Content**

- Merchandising information
- Sales knowhow
- Popularity
- Stock...

All Rights Reserved, Copyright © Fujitsu Limited. 2003
THE POSSIBILITIES ARE INFINITE
Summary

- Heterogeneous environment, past and present not yet converging to a more simple, homogeneous set of assumptions
  - Existing worldwide network and device diversity
  - Continual addition of a New Devices and OS platforms
  - New Devices even for non-IP networks

- Fujitsu has ubiquitous & mobile products and solution experience, interested in extending Open Standards
  - PCMCIA extended card with a built-in IEEE802.11b has been developed for seamless roaming between IP networks and cellular phone networks
  - A new middleware ‘Interstage’ with SeamlessLink, TerraCrawler and Cradle has been developed for intelligent services in ubiquitous environment
THE POSSIBILITIES ARE INFINITE