Case Study in Tourism:

F.E.T.I.S.H.

(Federated European Tourism Infrastructure System Harmonization)

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The F.E.T.I.S.H. Initiative

(Federated European Tourism Infrastructure System Harmonization)

An Intelligent Environment for Interoperable Value Added Services and Systems

◆ The value proposition of F.E.T.I.S.H.
  ■ Connect information systems (an Internet-based service bus) and Value Added Services (VAS) into a community where a critical mass of European resources and data can be shared over a network across a wide geography
  ■ A Reference Service Network that will create a competitive advantage in the travel service provider market

◆ The vision:
  ■ To be a leading supplier of distributed service solutions, which will provide tourism information and service integration.
  ■ By using a Service Oriented Architecture, F.E.T.I.S.H. gives to VAS providers a high-level, open architecture model that supports the production of reliable, platform-independent services
Main Objectives

- Establish the required infrastructure for supporting spontaneous network of tourism-oriented services.
- Supporting nomadic Tourists
- Offer Services carriers
- Share services
- Access and run services anywhere
- Support multi hardware, PDA, Cellular Phones, PC, GPS...
- Providing guidelines and facilities on how to adapt them to the FETISH environment
- Be a Cluster Project to allow
  - Allow external non a priori known tourism projects to join the Federation and add Information Contents
Basic Service Provider

Application are shared with suppliers to provide value added services

Information provider

Open inventory systems in exchange for better tools to end users

Value Added Service Provider

Combined Services are built from component on the federation

A business dial tone will be provided to service integration
### What kind of Services?

<table>
<thead>
<tr>
<th>Terminal agent</th>
<th>Intelligent push of Information</th>
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<tbody>
<tr>
<td>Positioning Agent</td>
<td>Reservation Engine</td>
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<tr>
<td>Modeling Agent</td>
<td>Map, GIS services</td>
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<tr>
<td>Service Broker Agent</td>
<td>Itinerary generator</td>
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<td>Offer Agent</td>
<td>Fidelity programs</td>
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<tr>
<td>Direct and reverse auctioning manager</td>
<td>Payment</td>
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<td>User Profiling</td>
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Where does data come from?

- Green and yellow regions will provide tourism information or link their system to the Fetish Network.
- Information is available now by a search engine (www.enjoyeurope.com)
- but will be used by any VAS. service-application
VAS and VE

- Implementation of the Infrastructure to support the integration of the existent tourism value-added services
- Allow Tourism Agency clerks to use a user friendly application that search, retrieve and link world wide distributed Services
F.E.T.I.S.H. Challenges

◆ To develop a platform infrastructure to accommodate constantly changing environments and for supporting spontaneous network of tourism-oriented services
◆ To integrate the fragmented tourism information systems and the IST-based value-added services, in a federated distributed community of resources
◆ To build a community where processes and services will be shared over a widely available tourism network
◆ Institute interoperable technology to connect to wired and wireless services and applications
◆ Supporting Citizens plugged-in:
  ■ Offer Service
  ■ Access and use service
  ■ Share and combine services
◆ Implementation of an infrastructure to support the integration of the existent tourism value-added services, providing guidelines and facilities on how to adapt them to the FETISH environment
◆ Harmonization in the Tourism Domain!
"We are creating digital Darwinism: a service that is able to evolve as the users need it to."

A. Nicolai FETISH Project Coordinator

"It is not the strongest of species that survive, nor the most intelligent, but the one most adaptable to change."
Partners

- Herzum Software, Italy: www.herzumsoftware.com
  - Technical and Architectural Coordination
- SUN Microsystems, Spain: www.sun.es
  - Distributed infrastructure
- T6, Italy: www.t6.it
  - Program Management
- Herzum Software, Italy: www.herzumsoftware.com
  - Repository
- IASI-CNR, Italy: www.iasi.it
  - Ontology
- ICEP, Portugal: www.icep.pt/english
  - Tourism Expertise
- Uninova, Portugal: www.uninova.org
  - Business Process & Workflow Definitions Tool
- New Trade Tech, Canada: www.ntt.ca
  - Service Provider, beta tester
- Forthnet, Greece: www.forthnet.com
  - Service Provider, beta tester
Foundation Model (Platform Focus)
System Level Components

- F.E.T.I.S.H. Repository (Herzum Software, Italy)
  - Business Component System
  - Service Definition Catalogue
  - Business Data Type Definition Catalogue
  - Service Modeler
  - Federated Access Resource Manager

- FADA, Fetish Advanced Directory Architecture (SUN, Spain)
  - Discover, Lookup & Join Services
  - Toolkit
  - Jini/XML-RPC Based
  - GUI/Text Admin Tool

- Symontos (IASI-CNR, Italy)
  - Ontology System

- PROMAN (Uninova, Portugal)
  - “value added client”
  - Design Work Flow (WF), link Basic Services

- FCA, Fetish Certification Authority (SUN, Spain)
  - Define Participants identify and authorizations
### Actors

- **F.E.T.I.S.H. Provider**
  - Provide tourist services
  - Implement proxies for accessing services
  - Can wrap the proxy in a VA service (i.e. website)

- **F.E.T.I.S.H. Client**
  - Retrieve the proxies to gather access to service

- **Generic F.E.T.I.S.H. User**
  - Use an application/Web Site that wraps a F.E.T.I.S.H. proxy

- **F.E.T.I.S.H. Committee**
  - Define/maintain ontology
  - Define/maintain FETISH repository
  - Define policy criteria for accessing F.E.T.I.S.H.
Use Case: Publish a Service

Service Interface Definition Catalogue

1. Check Ontology
2. Download Interface Definitions
3. Implement Proxy Service
4. Register Service

SymOnthos

Request to Commission

FADA Network

Download Interface Definitions

Upload a Proxy
Use Case: Retrieve a Service

1. Search for semantics
2. Download Interface Definitions
3. Lookup Service
4. Invoke a Proxy
4.1 Execute remote Service
Use Case: Execute a VAS

1. Search for semantics in SymOnthos
2. Download Interface Definitions
3. Lookup Service
4.1. Download Proxies
4.2. Invoke a Proxy
4.3. Execute remote Services
Adopted Strategies

- “The network is the computer”
  - Avoid “single point of failure”
  - “high availability”
- “Distributed Computing Architecture”
  - Component Oriented Software Manufacturing (COSMTM) approach
  - Hide Complexity
- “Service Oriented Architectures”
  - Provide run-time interfaces at any level
- Be the first user of our own infrastructure
- Open source project
- 100% Java Code
- Apply public and standard specifications
  - WSDL, XML-RPC, WFDL, XFORM,…
- XML as a “lingua franca” for intra/extra net F.E.T.I.S.H.
Component Model

- SERV-CAT FE
- SERV-CAT BE
- PROMAN
- Symontos FE
- Symontos BE
- FToolkit
- FADA Network
- Lookup/Register

- FETiSH Admin Console
- FETiSH Portal
- GUI
- RMI Interface
- Enterprise Tier
- Resource Tier

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Repository
What is it?

- Catalogue of Interface Definitions (verbs/actions)
  - Hotel Reservation, Car Rental, Theater Booking, Cancel,…
- Catalogue of Business Data Type Definitions (nouns)
  - Room, CancellationDeadline, BedBreakfast
- Catalogue of related data in order to support interoperability
  - Customers, Providers, Certificates, Implementation Instances
Repository Key Points

- Information Manager of F.E.T.I.S.H.
- Analysis and design of federated information mechanisms to support the requirements of Virtual Enterprise (VE) applications
- Management of metadata catalogue information to support standard interoperation among F.E.T.I.S.H. service providers/users
- Define visibility access levels for each services
- Export service definitions in WSDL and Java interface
  - Runtime transformation
Information Management Requirements

- Information Management Requirement Analysis for VEs in F.E.T.I.S.H.

- Service Interface Definitions Catalogue components
  - Application servers for Service/Data Interface Definitions catalogue
  - Interfaces:
    - Web server, the FETISH Project Portal
    - Runtime, FADA Proxy

- Federated Access Rights Manager (FARM)
  - Allows the definition and validation of visibility / access rights to service proxies both in general and within VEs

- FETISH Business Data Types
  - Including service providers profiles, end-user information, VE topology, etc.

- The FETISH Administration Console (part of the Federated Information Management System)
Different Kinds of Services

- There are many different kinds of services that require different access levels
  - Public services to be used by any customer
  - Customized services offered based on mutual trust relationships
  - Services within a VE, offered to other VE partners may be merged in a VAS
  - Composed VASs may be offered only to a select group of collaborator enterprises (e.g. specific travel agencies)

- The concept of service provision contracts and liabilities within a VE (supported by VASs) may need to be reinforced
  - Selective access rights is important to maintain trust among VE partners
Directory Service
What is FADA?

- With respect to the conceptual framework, FADA realizes a Distributed Network Technology
- Implements the webservice Transportation Bus Layers
  - Proxy distribution BUS
- Self-healing, self-adapting
- Operations:
  - Register()
  - Lookup()
- Build on top of Jini but significantly improving efficiency, current v4.0.1 addresses:
  - Lookup algorithm
  - Security & authentication
  - The “Firewall issue”: RMI replaced with XML-RPC over HTTP
  - HTTP Proxy aware
  - Adaptive Lease renew triggering
FADA Architecture Elements

F.E.T.I.S.H. Toolkit

Administrator
Cockpit
(AdminTool)
(AdminGUI)

Directory (FADA Nodes Network)

FADA (F.E.T.I.S.H. Advanced Directory Architecture)

LUS (Jini Lookup Service)
It is the Java F.E.T.I.S.H. Framework

It’s purpose is to ease the development of a F.E.T.I.S.H. proxy

- A Consumer is able to use services, in it’s system, with a minimum efforts, no Jini expertise needed
- A Provider is able to publish it’s system with minimum effort
- A Provider is able to access F.E.T.I.S.H. infrastructure

It sits on top of FADA
Registering a Service

Service Provider

- Service
- Service downloadable classes (CODEBASE)
- Service Proxy

F.E.T.I.S.H. Toolkit

Download Interfaces definitions and F.E.T.I.S.H. types

F.E.T.I.S.H. Repository

Http Server

Service Proxy

FADA Infrastructure

upload

Register

Keep alive
Using a Service

Service Provider

- Service
- Service downloadable classes (CODEBASE)
- Service Proxy
- FETISH Toolkit

Service Consumer

- Service Client
- FADA Infrastructure

HTTP Server

Download classes
Get Proxy Object
Lookup FADA

FETISH Repository

Service Proxy

Keep alive
Business Process Modeling
(A Value Added Client)
Solution

◆ PROMAN as the solution to solve VAS and WF Modeling
  - Uses the F.E.T.I.S.H. architecture
  - Extends the functionalities of F.E.T.I.S.H. composed of basic services

I have extended functionalities. So I can provide personalised complex services.
PROMAN System

- **Creation/Edit**ion of VAS / WF Models
- **Execution** of remote services in chain (workflow)
  - Remote J2EE executor engine
- **Not a technical expertise needed** (no Java, XML, FADA, Jini) to define VAS
- **RunTime** edition:
  - Evaluate conditions
  - Execution monitoring
  - Watch facility
  - BreakPoint facility
- **Build on top of the F.E.T.I.S.H. infrastructure:**
  - Linked with ontology component
  - Linked with FETISH repository
  - Linked with FADA
- **VAS is automatically provided as simple services**
Example: WF Editor
Example: BDT Mapper
Example: WF Executor
"It is not the strongest of species that survive, nor the most intelligent, but the one most adaptable to change."

Charles Darwin 1809 - 1882

"We are creating digital Darwinism: a service that is able to evolve as the users need it to."

A. Nicolai, FETISH Project Coordinator
References
FETISH References

- Fetish is the world’s **3rd largest** implementation of a distributed computing architecture using Jini technology
- Our presence was requested at **JavaOne**, 7th June 2001 in San Francisco!
- Fetish has been chosen by Sun Microsystems as a world **reference case** for advanced distributed computing architecture
- Agreement of cooperation with German Space Agency for Nomadic Services distribution
- Public results, **open source** model, offers support services to vertical research projects
Standards & Organizations

- COSM: www.componentfactory.org
- Jini: www.jini.org
- UI Services: www.artima.com/jini/serviceui/Spec.html
- XForm: www.w3.org/TR/2001/WD-xforms-20010608
- OPAL: Object, Process and Actor modeling language
- WSDL: www.w3.org/TR/wsd1
- XML-RPC: www.xmlrpc.org
- WFMC: www.wfmc.org
Relevant Websites

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- jini://fada.fetishproject.com
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- www.symontos.org
- https://sourceforge.net/projects/fetishproj
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- ICEP, Portugal: www.icep.pt/english
- Uninova, Portugal: www.uninova.org
- New Trade Tech, Canada: www.ntt.ca
- United Europe: europa.eu.int
- Open Source Development Network: www.osdn.com
Books

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