Towards XML As A Secure Intelligent Agent Communication Language

by

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Agenda

- Intelligent Systems
- Enterprise Systems and Intelligent Agents
- Intelligent Communications
- OSI Intelligent Telecommunications Architecture
- Secure Intelligent Agents Communication
- Secure Intelligent Documents Infrastructure
- Recommendations for further research
Previsouly known as “Expert Systems”

Knowledge Management, Machine Learning, Neural Networks, Data Mining, Intelligent Agents

Information Agents--adaptive agents, rational agents, mobile agents

Agent Communication Language

Intelligent Documents
Intelligent Agents

Agent Architectures

- Persistent agents
  » human-to-agent interface
- transient agents
  » agent-to-agent
- Multiple Agent Systems
  » service-oriented
  » interagent communication

Ontologies
Intelligent Communications

- **Speech-Act Theory**
  - Performatives ans communicative acts

- **Information Richness Theory**
  - Schemas and arbitrarily structured data types

- **Media Richness Theory**
  - need to add agents and documents
Intelligent Networks

- ISO OSI Model
- Telecommunications Infrastructure
- Power grid infrastructure
- Agent Based OSI Model
# Traditional OSI Model

<table>
<thead>
<tr>
<th>Network A</th>
<th>Application</th>
<th>^</th>
<th>Application</th>
<th>^</th>
<th>Application</th>
<th>⬛</th>
<th>Application</th>
<th>⬛</th>
<th>Application</th>
<th>⬛</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>←-------------Serial------------→</td>
<td>⬛</td>
<td>Link Control</td>
<td>←-------------802.3------------→</td>
<td>⬛</td>
<td>Network</td>
<td>←-------------IP X.25------------→</td>
<td>⬛</td>
<td>Network</td>
<td>←-------------IP X.25------------→</td>
</tr>
<tr>
<td>Link Control</td>
<td>←-------------802.3------------→</td>
<td>⬛</td>
<td>Transport</td>
<td>←-------------TCP------------→</td>
<td>⬛</td>
<td>Session</td>
<td>←-------------SNMP------------→</td>
<td>⬛</td>
<td>Session</td>
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</tr>
<tr>
<td>Session</td>
<td>←-------------SNMP------------→</td>
<td>⬛</td>
<td>Presentation</td>
<td>←-------------SMTP------------→</td>
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</tr>
</tbody>
</table>

Network A | Network B

| Table 1. ISO OSI Model |
Agent Based OSI Model

(Network A) Multimedia Hypermedia
Application
Presentation
Session
IPNG/MOBILE IP
Intelligent Agents
Transport
Internet
WIRE/WIRELESS
Wired/Wireless

(Virtual Network) Adaptive Agents
Application
Presentation
Session
Intelligent Agents
Transport
Internet
Intelligent Agents

(Network B) Multimedia Hypermedia
Application
Presentation
Session
IPNG/MOBILE IP
Intelligent Agents
Transport
Internet
Intelligent Agents

(based on Chorafas, P. 123)
Secure Intelligent Agents Communication

- **User-Agent**

- **Agent Communication Languages**
  - Knowledge Query Manipulation Language
  - Foundation for Intelligent Physical Agents ACL
  - Extensible Markup Language
KQML Intelligent Network Telecommunication Stack

Network A

Network B
FIPA ACL Intelligent Network Telecommunication Stack

Network A

Network B
Secure XML Intelligent Network Telecommunications Stack

Network A

Network B
Intelligent System Management Architecture
Object-Oriented Intelligent System Management

Intelligent Databases

3D Agent Interface
2D Agent Interface
Web Agent Interface
Broker Agent Interface

Common Object Repository

Other Managers
System Manager
Application Managers
Security Managers
Network Managers

agent
agent
agent
agent
3rd party agent
Secure Intelligent Documents Infrastructure Model
Conclusions

- Secure Intelligent Internet Communications
- Secure Intelligent Documents as Intelligent Agents using XML
- Secure B2B electronic commerce
- Secure Intelligent Extranet Communications
Secure Intelligent Internet

Secure Intelligent Communication over Secure Intelligent Networks

Secure Intelligent Document Infrastructure Architecture