Personal view of
Agent Applications in Business

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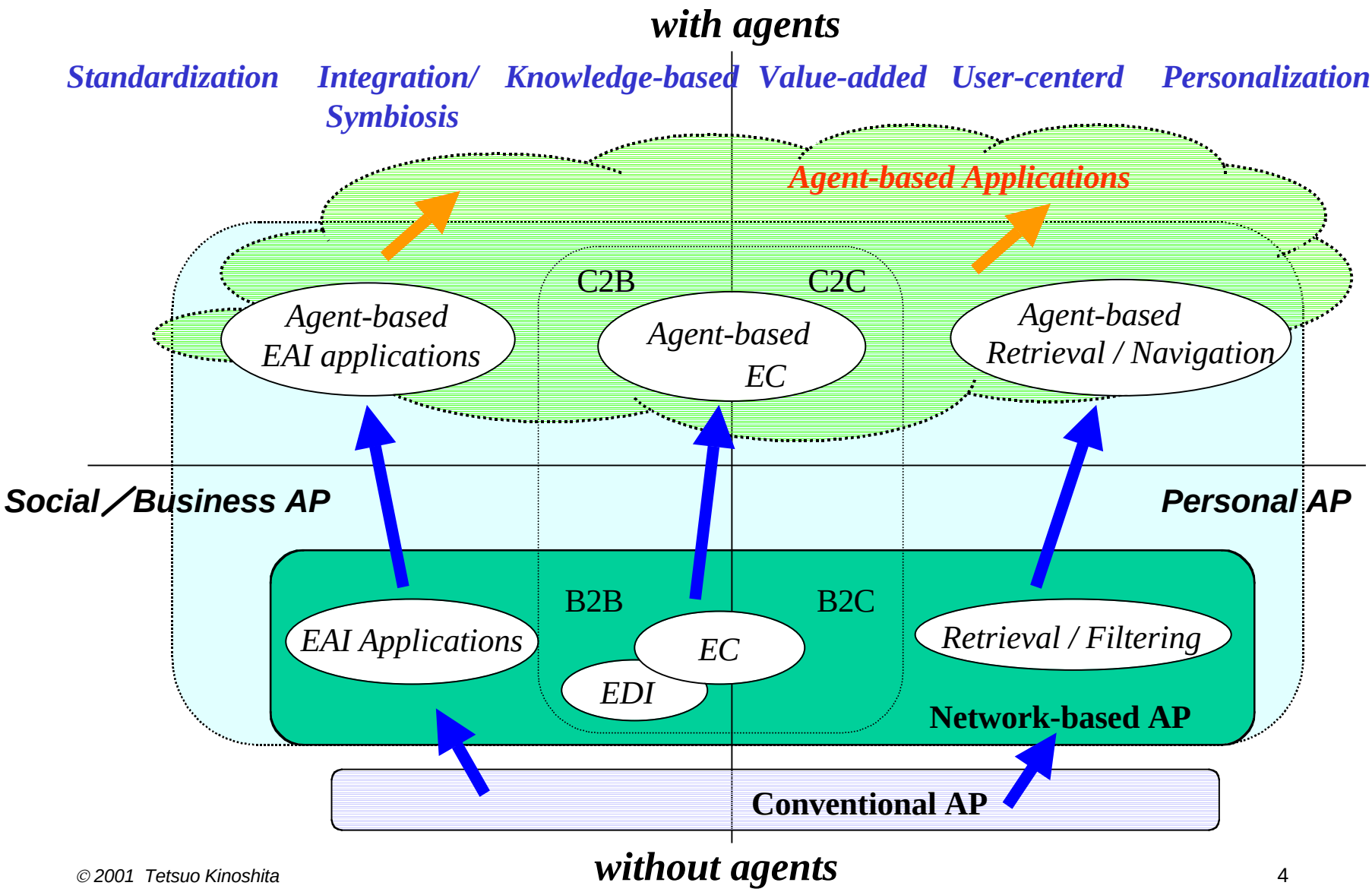
Results of Research Activities of

Special Interest Group of Agent Applications in Business
Technical Committee of Network Agent, JIPDEC(MITI)
FY: 1999~2000

EC	IBM Japan, NTT-software, etc.
EAI	Mitsubishi, Unisys, etc.
Information Integration	Fujitsu, Cannon, etc.
Information Access Service	Hitachi, Cannon, Matsushita, etc.
Manufacturing Control System	Yokogawa.
Community service	Sony, NTT
Household Appliance	Pioneer, etc.
ITS	Toshiba
Personal guidance agent	ATR
Interface agent.	Omron, Sharp, etc.
Broadcasting	NHK
Agent Server	IBM Japan
Socialware Platform	NTT
Mobile agent platform	Toshiba, Mitsubishi, NEC, Fujitsu, IBM, etc.
FIPA compliant platform	Comtech
(Flexible Network . Agent framework	Tohoku Univ. 〃)

I. Agent-based Applications in Business



Features of EAI

(1) Simple replication/synchronization cannot satisfy the customers' requirements

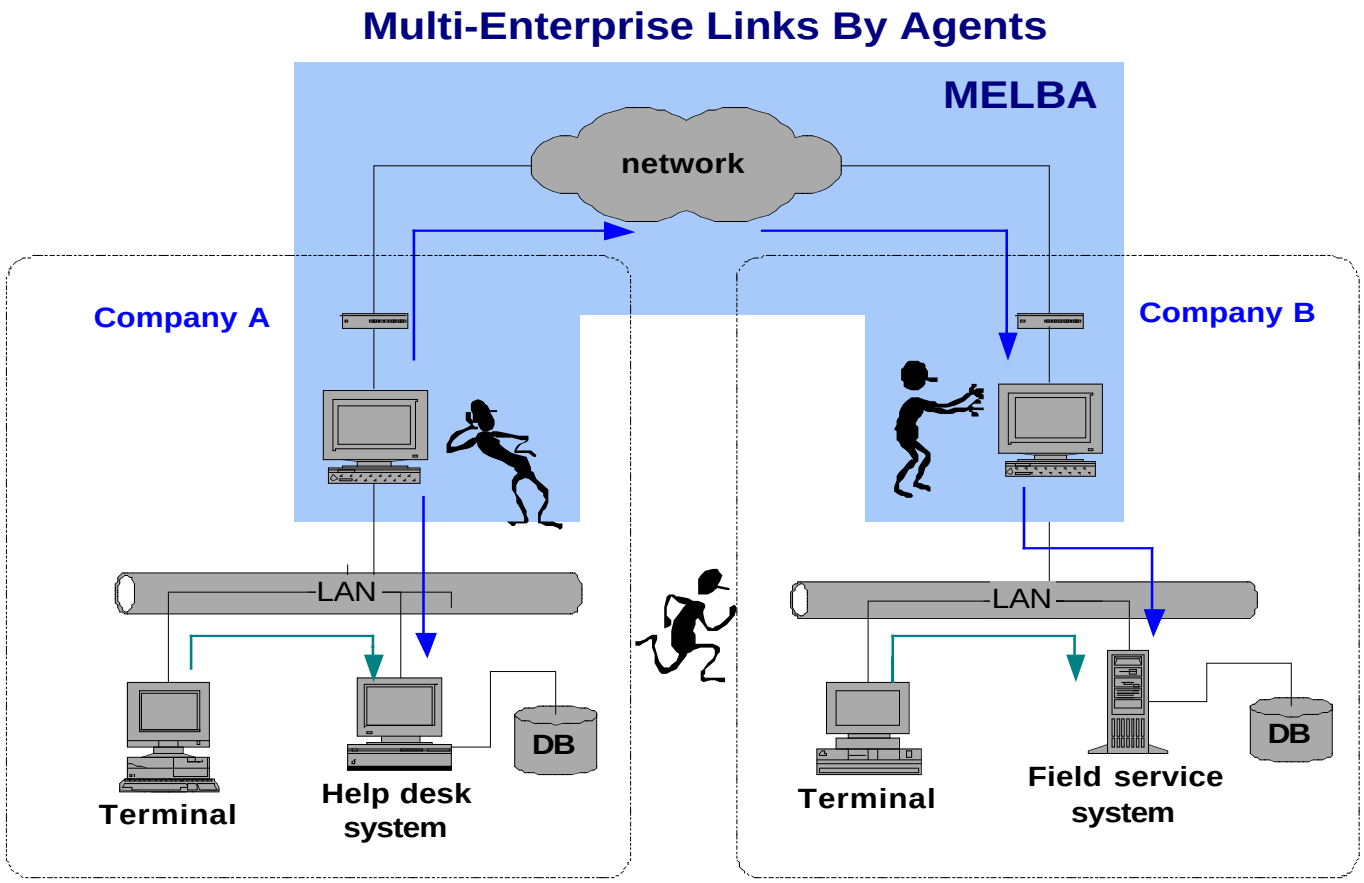
- different data formats for different applications
- different semantics of data for same applications

(2) Application software are tightly coupled with the workflows

- integrate only a part of functions/data of collaborative companies

(3) Requests for using customers' functions such as error handling policy, workflows, and so on.

CIS (Customer Information Services)
Business Workflow (linked by agents)



三菱電機（株）

Experience of EAI application

- Mobile agents for distributed monitoring/management, alarm handling, test/debug, and system maintenance
- Reduce the costs and time of development of network programs
- Deliver the programs through communication networks
- Update the system's specifications
- Encryption and authentification functions of agent platform

Problems in EAI Applications

- Prevent loss of mobile agent and maintain system's security

  → trade-off between processing speed and functions

- Agent programming

  → enhancement of tools

- Standard specifications for security

- Coexist with XML technologies

Trends of EAI companies

- ObjectSpace (Voyger mobile agent → ORB, EJB, SI)
- CrossWorld (ERP-integrated software)
- ActiveSoft (Agent technologies, SI → webmethod)
- webMethod (XML application technologies : WIDL, WSDL → B2B Integration)

II. Advantages of Agent Applications in Business

(1) Development of Applications

EAI, EC, Household appliances, Public services, etc.

- Improve extensibility and flexibility of application systems
- Reduce the costs and time of development and maintenance of application systems
- Increase the operational performance of applications
- Improve understandability of the designed system

Advantages of Agent Applications in Business

(2) Suitable tasks in Business applications

- Remote management/operation
- Distributed monitoring/Fault Detection/Alarm handling
  (asynchronous event handling tasks)
- Mediation, Negotiation, Auction, Information brokerage
- Personalized services
  (personal information management, personal environment)

Advantages of Agent Applications in Business

(3) Useful Features of Agents

- Autonomous/Intelligent behavior of agents
  (resident agent / mobile agent)
- Intimacy of web-based information processing and/or mobile communication environment
- Information sharing among agents
- Task sharing among agents
- User-friendly interaction: avatar / believable agent

III. Problems of Agent Applications in Business

(1) Development of applications

- Methods and tools (design, implementation, test/validation, etc.)
- Discrimination from competitive technologies
  XML, SOAP, UDDI, ebXML, e-speak, EAI-tools, Object-oriented
- Contents/resources accessed by agents
  (security/safety, intellectual properties)
- Task sharing between human worker and agents

Characteristics of Agent		Existing technologies	Competitive XML technologies
Autonomy	independency	Distributed processing	
	persistency	Persistent DB/daemon	
	proxy/surrogate	Fixed purpose proxy	
Intelligence	Inference	Artificial intelligence	
	Interaction	Intelligent interface	ebXML, WSDL
	Dynamic interface	CORBA	XMLSchema, SOAP, UDDI, e-speak
	adaptability	Learning algorithm	
	rationality	Designed by designers	
Social ability	Cooperation/ collaboration	Distributed algorithm Cooperation protocol, workflow	ebXML, e-speak, WSDL
	Competition	Auction, economic model	CBL, CXML
	Dynamic participation	Service advertisement	UDDI, e-speak, WSDL
Mobility	Mobile agent	Mobile object, process migration	

Problems of Agent Applications in Business

(2) Technologies

- Performance
- Scalability
- Security and safety (⇔ Robustness)
- Interoperability/connectivity of another(legacy) systems
- Persistency

Problems of Agent Applications in Business

(3) Strategies for popularization

- Accumulate and share information of experience and know-how of developing applications
- Provide useful methods and tools
- Consider the sense of vales of users and enhance the reliability of agent technologies

Towards Agent-based Applications