Cloud Computing Business
Development Status and Market Forecast
Cloud computing-related inquiries: 800+

- Announced cloud services in April, enterprise cloud development products in October
- Compared with inquiries related to using Fujitsu cloud services, slightly under 20% relate to building private enterprise clouds, but inquiries expected to grow

**Cloud-related Business Inquiries (Apr-Dec)**

![Graph showing cloud-related inquiries from April to December]

**Trend ①: Using Fujitsu Cloud vs. Building Private Clouds**

- **Use Fujitsu Cloud**: 83%
- **Build Private Enterprise Clouds**: 17%
- **Individual Hosting**: 16%
- **Shared Cloud Platform**: 84%

- Over 80% for using Fujitsu cloud services
- Some inquiries are for individual hosting (separate servers, circuits, etc.)
Although most inquiries relate to server consolidation and virtualization for existing systems aimed at lowering costs, there has been a recent increase in inquiries for infrastructure integration and development/DR environments.

Previously, most customers were still considering how they would use cloud services, but now most have a specific use in mind.

**Trend ②: Purpose of Adoption**

- **64%** Simpler, cheaper operations
- **24%** Infrastructure standardization, integration
- **12%** Dev/DR
- **12%** New biz development

**Trend ③: Usage Patterns**

- Undecided
- DaaS
- Development/DR
- Infra Integration
- Server Consolidation
- /Virtualization

As of December 2009
Projected Growth of Cloud Computing in Japan

- Market for cloud computing expected to grow by **16x** (2008⇒2015)
- Cloud computing expected to account for 20% of IT market (2015)

**Cloud computing as % of IT market**

- **2008**: 1.3%
- **2012**: 6.0%
- **2015**: 20.1%

**On-premise**: IT systems running within a company

Based on external research
Issues, Risks Related to Cloud Computing

Concerns about security, service quality, connection with other systems and service continuity

From FRI web survey of 2,000 respondents from companies with over 100 employees (primarily from information systems departments). Conducted August 2009.
### Leaning Toward IT Vendors in Japan

With regards to security, quality, data protection and other factors in deploying cloud systems, most customers in Japan want to deal with Japanese IT vendors

#### When deploying a cloud system, whom do you want to deal with?

<table>
<thead>
<tr>
<th>Category</th>
<th>Very Large Companies (over 100 billion JPY)</th>
<th>Large Companies (10-100 billion JPY)</th>
<th>Mid-Sized Companies (1-10 billion JPY)</th>
<th>Small Companies (under 1 billion JPY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japanese IT Vendor</td>
<td>77</td>
<td>56</td>
<td>66</td>
<td>33</td>
</tr>
<tr>
<td>Packaged Services Vendor</td>
<td>31</td>
<td>20</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Reseller</td>
<td>9</td>
<td>15</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Data Communications Company</td>
<td>23</td>
<td>15</td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>Accounting Firm</td>
<td>6</td>
<td>13</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Independent IT Consultant</td>
<td>11</td>
<td>15</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>IT Manager of Affiliate</td>
<td>14</td>
<td>17</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Customer or Supplier</td>
<td>0</td>
<td>6</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>Cross-Industry Community</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Financial Institution</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Find on Own Through Web, etc.</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

(Outside survey conducted in September 2009)
Survey of 169 respondents (only those interested in shifting to cloud)
Fujitsu’s Initiatives
1. Fujitsu’s Approach to Cloud Computing

Brings together all of Fujitsu’s services know-how and technologies

- Comprehensive cloud environments with priority on security and quality (trusted services)
- Developing cloud services in collaboration with partners (cloud vendors) to maximize offerings to customers and offer optimal cloud environment

Other Vendors’ Clouds

1. Collaboration

Fujitsu

- Applications
- Application Platform
- Virtual Cloud Platform
- Physical Cloud Platform
- FENICS II Universal Connect

IaaS: Infrastructure as a Service, PaaS: Platform as a Service, and SaaS: Software as a Service
Fujitsu’s Strengths

• Fujitsu approaches cloud computing by taking into consideration both application development and infrastructure (network, servers, middleware)
• Strong track record in migration from legacy systems (mainframes → open systems)
• Equipped to manage system updates and upgrades as part of long-term system use

Fujitsu is the only vendor that can deliver outsourcing from the position of the customer, ensuring both high quality and reliability
2. Cloud Business in Tandem with Existing Systems

Co-existence of new and existing systems and increase in mixed system integration

1970 - 2000

- Highly reliable, efficient processing of large data volumes
  (Mission-critical → Business support)
- Mainframes, small biz computers, stand-alone systems

2000 - 2010

- Transition to the Internet
- Mainframes, Workstations, and open systems connected via LAN/WANs
- Grid
- Virtualization technologies

2010 -

- Cloud computing

- New Markets

- Combined new systems with existing systems

<table>
<thead>
<tr>
<th>Mainframes/Workstations</th>
<th>Open Systems</th>
<th>Cloud Computing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>①</strong></td>
<td>Source of data is expanding to frontline work sites, with data volume rising</td>
<td></td>
</tr>
<tr>
<td><strong>②</strong></td>
<td>Integration of virtualization/cloud environments</td>
<td></td>
</tr>
<tr>
<td><strong>③</strong></td>
<td>Integration that combines cloud systems with mainframes, small business computers and open systems</td>
<td></td>
</tr>
</tbody>
</table>

Volume of Data

Combining new systems with existing systems
Existing Markets and New Markets

IT that contributes to customers’ management

- Higher cost efficiency by consolidating, virtualizing servers of existing systems
- Quickly responding to change and speeding up the pace of management
- Expanding the applicability of information technology with IT that is personalized and can handle unlimited data

Existing Markets

Corporate Systems
- Mission-Critical Systems
- Front-end Systems

New Markets

Infrastructure for Networked Society
- Energy
- Residential Services
- Environment
- Transport
- Agriculture
- Health

Private Clouds

Public Clouds

Hybrid Cloud Integration

Fujitsu Clouds

Other Vendors’ Clouds
Implementing a shared, standardized business platform via cloud and SI
- Delivers standardized, high-quality business platform
  --Customer uses system globally
- SI work provided links to existing systems and application development on business platform

- Multilingual service
- Fault recovery within 24H
- High security requirements
Testing of service operability and maintainability, bottleneck verification and new business opportunities has taken place since July 2009.

**Internal/External Pilot Projects**

- Verification of operability and maintainability
- Verification of bottlenecks
- Verification of new businesses

**30 Projects**

- Agricultural SaaS
- Traffic Info System
- CAD
- Video distribution over networks, etc.
Internal Case Study: Numazu Development Center

Pre-Deployment

- Servers dispersed between development centers, leading to a deficiency in processing power during peak development times
- Growing number of test patterns and sluggish development speed
- Building test environments burdensome for developers

Post-Deployment

- To consolidate servers dispersed between development centers and automate operations
- 12 virtual servers per physical machine
- Time required to build test environment reduced from 6 hr to 10 min
- Developer administrative burden reduced to zero

Circumstances Prior to Deployment

Purpose and Results
Co-sourcing and globalization to develop new business in collaboration with customers

Fujitsu will partner with companies in Japan to develop and offer high-quality cloud services that can be rolled out globally.
Making eco-driving and delivery status info visible through the cloud

- Service combining on-board terminals and mobile communications with cloud-based applications for transportation guidance and location tracking for logistics companies and their shipping/delivery customers

- Avoid accidents by driving safely
- Reduce costs by improving fuel efficiency
- Reduce CO2 emissions
- Improve service by making delivery status information visible
New Cloud-Based Services for the Office

By leveraging the cloud, Fujitsu delivers solutions that provide comprehensive global support to end users for their IT equipment across its entire life cycle (planning, design, deployment, operations, retirement, and disposal)

Customer Business Environments

- At the Office
- On the Go
- At Home
- Global

(End User IT Equipment)

Fujitsu Service Platforms

Fujitsu Cloud Service Platforms

Network

Security Operations Center
Service Desk Center
Kitting Centers
Service Engineer

Thin Client Admin Systems
Mail/File Servers
Service Mgmt Systems
Server Farms
System Integration Initiatives
The Evolution of System Integration

1970s – 1990s

- Highly reliable, efficient processing of large data volumes
  (Mission-critical ➔ Business support)

Mainframe Era

2000 - 2010

- Shortened development times
  Decent quality considering the cost

Open Systems Era

2010-2020

- Reduced operational burden
  Packaged, fast and cheap with decent reliability

Towards the Cloud Era

Cloud

- Server consolidation and virtualization technologies

Evolution Process

- Numerous mission-critical systems built on mainframes
- Striving to build mission-critical systems as open systems
- New challenge of reducing operating loads

Integration

Quality assurance

Reduced costs

Constant challenge of shortening development time and lowering costs
Gap in Cloud Realities vs. Expectations

Although the definition of the cloud is vague, customer expectations are high. But there is also a big gap in understanding what the cloud really is.

<table>
<thead>
<tr>
<th></th>
<th>Customer Expectations Regarding the Cloud</th>
<th>Gap with Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Immediate</td>
<td>Based on the concept that “computing power can be immediately used,” customers think services can start quickly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Time required to design and develop applications cannot be significantly shortened</td>
</tr>
<tr>
<td>2</td>
<td>Cheap</td>
<td>Expectation that system development is inexpensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customers have not shed previous attitudes about wanting to make various special requests</td>
</tr>
<tr>
<td>3</td>
<td>Easy</td>
<td>Assumption that applications are “platform-free” and that building infrastructure requires little time or effort</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infrastructure work is actually more difficult, and companies need to consider how to maintain the confidentiality and security of data</td>
</tr>
<tr>
<td>4</td>
<td>Non-professional</td>
<td>Assumption that computing environment can be maintained without need for specialists and that applications can somehow be delivered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Companies need to consider the importance of maintaining and preserving long-term application resources</td>
</tr>
</tbody>
</table>
Fujitsu’s traditional core market, which was primarily the back offices of corporations, is saturated and shrinking in size. From now on, the market is shifting to a services-oriented integration business encompassing the overall business of customers and society as a whole.

**Fujitsu’s Traditional Core Markets**

- **Back Office**
  - Mission-Critical Systems
  - Private Cloud

- **Frontlines**
  - SaaS Applications
  - Highly Productive Development Tools

**New Markets**

- **Widespread Networks & Social Infrastructure**
  - Energy
    - Smart Grid
  - Agriculture
    - Traceability Imaging and Camera Network
  - Transport
    - Probe Info
  - Health
    - Telemedicine
  - Residential Services
  - Environment

**Complete Integration: Hybrid Cloud**
Integration with Back Office Systems

① SI to migrate existing systems to the cloud
② SI focused on mission-critical databases
③ SI for a management system to handle large volumes of data

In the cloud:
- Mission-critical systems
- Highly reliable systems for keeping data secure
Integration with the Business Frontlines

1. SI to enable customers to migrate to SaaS
2. SI to improve the ease of use of internal systems (by promoting web-based services)
3. SI to leverage the power of data

Building user-friendly systems very quickly and inexpensively
Integration with Widespread Networks

1. SI to employ cutting-edge technology in specific industry segments, such as sensing networks and smart-grids
2. SI to build capability to collect all kinds of data from anywhere

Systems that apply new technologies, such as sensing, RFID tags and networking
Hybrid Cloud Integration

① Highly reliable, comprehensive SI, bringing together back offices, frontlines and widespread networks
② SI of mission-critical systems in the cloud
③ SI that integrates and combines separate clouds

Back Office
Mission-Critical Systems
Private Cloud

Complete Integration
Hybrid Cloud

Frontlines
SaaS Applications
Highly Productive Development Tools

Widespread Networks & Social Infrastructure
Energy
Smart Grid
Agriculture
Traceability Imaging & Camera Network
Transport
Probe Info
Health
Telemedicine
Residential Services
Environment

Other Vendors’ Clouds
salesforce.com
Netsuite
Microsoft
QCD (quality, cost and delivery) is needed in any era

1980s
Era of Centralization
(IT Dept. Perspective)

Late 1990s
Era of Distributed Computing
(Business Unit Perspective)

Late 2000s
Era of Governance
(Senior Management Perspective)

Mainframe System

Distributed Open System

Control Applications

Infrastructure is different for each business system

Overall Company Perspective

B.U. Perspective

B.U. Perspective

B.U. Perspective

PaaS

IaaS

Framework

ISV

Middleware

Servers

Network

Storage

IHV
SI Needs in the Cloud Computing Era

Highly accurate and reliable technology that integrates everything, from specification determination method to design, development and maintenance.

Know-how in integration of business unit perspective + Know-how in integration of overall view of company activities

System support technologies that incorporate cloud-based operational know-how

Technologies to build complex cloud environments that include networks, servers, and storage, as well as OS, databases and middleware, including products from other vendors

Late 2000s
Era of Governance

Overall View of Company Activities

B.U. Perspective

B.U. Perspective

B.U. Perspective

Business System

Multimedia Internet, etc.

Framework

PaaS

ISV

Middleware

IaaS

Servers

Network

Storage

IHV
Fujitsu’s Approach

Highly accurate and reliable technology that integrates everything, from specification determination method to design, development and maintenance.

Technologies to build complex cloud environments that include networks, servers, and storage, as well as OS, databases and middleware, including products from other vendors.

Providing integration services based on combined knowledge of reliability and cloud technologies.

Know-how in integration of work skills +
Know-how in integration of overall corporate activities.

Integrated Transformation of Design, Production and Maintenance
Collective management of information on operations, from design to production, including management-level needs, to deliver services that take LCM into account.

Standardized IT Platform (TRIOLE) for the Cloud
Integrating massive, complex cloud technologies into a cloud-based platform.

Transformation of Workstyles
Leveraging the system development and support know-how that Fujitsu has accumulated over many years.

Dedicated Organization for Cloud Systems
A group of system engineers to deliver system integration for the cloud era, working across industry boundaries.
Transformation of Design, Production and Maintenance

Specification determination method is critical for successful system development

Japanese press release, October 7, 2009

PaaS-Enabled Integrated Framework

- •Techniques, methodology, mechanisms (specification determination, model development, design)
  •Work standards, work guides
  •Rules, standards, etc.

Support Tools
  •Requirements/Design info check program generator
  •Vulnerabilities/Symbolic check test generator …

Reusable Materials
  Reusable materials by domain
  General use reusable materials

ALM (Application Life Cycle Management)
Standardized IT Platform (TRIOLE) for the Cloud

In the open-system era, middleware environments were not standardized. In the cloud era, middleware will be standardized. Fujitsu will provide standardized middleware for each level of IT system platform.

- Shared services offered through pay-per-use system, company-wide or in individual divisions
- Integrate systems with services via the network
- Create a frontline platform in order to fully implement cloud services
- Initiate trial of cloud services in non-mission-critical systems

Virtualization Platform

Networking & Service Platform

Cloud Platform
Bringing together different knowledge and leverage the collective wisdom in order to transform workstyles for the cloud era.

① Sharing: Creating a space for sharing information throughout the lifecycle
② Re-using: Storing processes as knowledge, in addition to contents, to enable them to be re-used with better quality
③ Personnel Development: Using process knowledge to effectively train new employees

Fujitsu System Development Environment as an Example of SaaS

Name: ProjectWEB

• Links all Fujitsu SEs
• English supported. Has been applied to some locations outside Japan
• Especially useful for joint development work with offshore locations

Has been used for approximately 7,800 projects
Dedicated Organization for Cloud System Integration

Organization of experts selected from among all Fujitsu Group field SEs
- Bringing together the best SI technology in the Fujitsu Group to take services to an even higher level
- Bringing together the best product technologies in the Fujitsu Group and ensuring the latest technologies are applied to frontline operations

Field SEs
(manufacturing, retailing, finance, utilities, telecom, government)

Field SE/Sales

Employees

Framework, Support

Cloud Architect Office
Established Dec 21, 2009

Technology Support Business Group

Cloud Implementation and Verification Center
Established Dec 21, 2009

IT Services Business Group

Software Business Group
Platform Technology

System Products Business Group
Advanced Technology

Fujitsu Labs
Latest Technology

Business Units
Next-Generation ICT based on Cloud Computing

• Providing comprehensive cloud computing services, encompassing networking, hardware, middleware, and application development, with superior quality and security

• Integrating or migrating legacy systems with new cloud-based systems or systems from other vendors

• Working in partnership with customers to develop new uses of, and value from ICT and to create new business models and markets

Fujitsu’s comprehensive strengths allow it to leverage the cloud to deliver “integration and transformation”
Cautionary Statement

These presentation materials and other information on our meeting may contain forward-looking statements that are based on management’s current views and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in such statements. Words such as “anticipates,” “believes,” “expects,” “estimates,” “intends,” “plans,” “projects,” and similar expressions which indicate future events and trends identify forward-looking statements. Actual results may differ materially from those projected or implied in the forward-looking statements due to, without limitation, the following factors:

• general economic and market conditions in the major geographic markets for Fujitsu’s services and products, which are the United States, EU, Japan and elsewhere in Asia, particularly as such conditions may effect customer spending;
• rapid technological change, fluctuations in customer demand and intensifying price competition in the IT, telecommunications, and microelectronics markets in which Fujitsu competes;
• Fujitsu’s ability to dispose of non-core businesses and related assets through strategic alliances and sales on commercially reasonable terms, and the effect of realization of losses which may result from such transactions;
• uncertainty as to Fujitsu’s access to, or protection for, certain intellectual property rights;
• uncertainty as to the performance of Fujitsu’s strategic business partners;
• declines in the market prices of Japanese and foreign equity securities held by Fujitsu which could cause Fujitsu to recognize significant losses in the value of its holdings and require Fujitsu to make significant additional contributions to its pension funds in order to make up shortfalls in minimum reserve requirements resulting from such declines;
• poor operating results, inability to access financing on commercially reasonable terms, insolvency or bankruptcy of Fujitsu’s customers, any of which factors could adversely affect or preclude these customers’ ability to timely pay accounts receivables owed to Fujitsu; and
• fluctuations in rates of exchange for the yen and other currencies in which Fujitsu makes significant sales or in which Fujitsu’s assets and liabilities are denominated, particularly between the yen and the British pound and U.S. dollar, respectively.