MetaArc / K5
Meeting for Investors

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Supporting Digital Transformation: Fujitsu's Digital Business Platform

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Global SI Technology Unit
Head of Unit
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The Era of the Digital Transformation

- Utilizing the most advanced ICT to rapidly respond to business changes
- Collaboration and co-creation that transcends business and industry boundaries
Destruction and Creation Brought by the Shift to Digital

The state of business and society can be rewritten through ICT

Marc Andreessen, cofounder of Netscape and someone who continues to shape technology trends in Silicon Valley, once said that you can either have software take away your job or you can use it to increase your profits.
### 3 Directions of Digital Innovation

- **Society and Industry**
  - An era where consumer technology is diverted for use in enterprise business units and the military field
  - **ICT is moving to an era where on-site activities are added to information systems**
    - IoT/M2M
    - Smart cities/smart grid
    - Mobile payments

- **Relationships with Customers**
  - **Relationships with customers are shifting to digital**
    - Digital consumers
    - Digital marketing
    - Open service innovation

- **Organizational Operation and Ways of Working**
  - **Organizational Operation and Ways of Working**
  - **From individual mobile use to team information sharing**
    - Transformation of ways of working
    - Tribalization of organizations and human resources
    - Transformation of decision-making processes
Destruction and Creation Brought by the Shift to Digital

- Transforming business and creating new businesses through the use of digital technology and digital information.

**Improvement and Expansion**

- **Outside (Customers)**
  - Improved business responsiveness
    - Strengthening of customer relationships
    - Expanding sales channels
    - Improvements in quality and delivery

- **Inside (within the company)**
  - Improved business efficiency
    - Automation of tasks and labor saving
    - Visualization and measurement of management
    - Transmission, sharing and reuse of information

**Transformation and Creation**

- **Acceleration of business**
  - Creating new customer value
  - Business model changes
  - Entry into new business areas

- **Evolution of business**
  - Automation of business itself
  - Replacement of decision making methods
  - Transparency of organizational operation

From a lecture at IT Trend 2015 ITR by Mr. Uchiyama
Customer Efforts toward Digital Transformations

- Promoting ecosystem building through co-creation with customers
- Carrying out over 300 PoC*/operational trial
  ※ PoC : Proof of Concept (testing new technology and ideas)

<table>
<thead>
<tr>
<th>Top 8 areas of PoC/operational trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer analysis/marketing</td>
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<tr>
<td>Transportation info./disaster prevention</td>
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<tr>
<td>Product traceability</td>
</tr>
<tr>
<td>Factory visualization</td>
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<tr>
<td>Safety (seniors/children)</td>
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<tr>
<td>Advanced agriculture/husbandry</td>
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<tr>
<td>Facility monitoring/maintenance</td>
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<tr>
<td>Retail customer movement analysis</td>
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<tr>
<td>About 60 trials</td>
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<td>About 40 trials</td>
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**Issue recognition**

**Companies’ Status: Percentage of ICT Spending**

- An issue of conflict between reducing operating expenses and investing in transformation and growth

![Percentage of ICT Spending by Region](chart)

<table>
<thead>
<tr>
<th>Region</th>
<th>Budget Percentage</th>
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<tbody>
<tr>
<td>Europe</td>
<td>65%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>68%</td>
</tr>
<tr>
<td>Japan</td>
<td>76%</td>
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<tr>
<td>North America</td>
<td>67%</td>
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</tbody>
</table>

Total IT budget for 2014 broken down by percentage, by business region (Average value: %) (Budgets for Japanese companies are by accounting fiscal year, companies outside Japan are by calendar year)

Source
Graph created by Fujitsu on the basis of research by Gartner

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IT is Indispensable in Responding to Market Changes

- More than half of companies undertaking “disruptive IT investment” have increased revenue and profits.

Uses of increased budgeted funds in companies that have increased IT budgets:

- Mobile technology investment
- Rapid response to market and customer changes
- Using new technology/products/services
- Business model transformation using IT
- Expanding business content/product lines
- Strengthening analysis of customer actions/market through IT
- Strengthening product/service development through IT
- Periodic system upgrade cycles
- To implement a private cloud
- To convert business process not using IT to use IT
- Business efficiencies/cost reductions through IT
- To respond to legal regulations
- Because revenue is increasing
- Because profits are increasing
- Because of expansion in the size of the company

Source: JEITA/IDC Japan – Analysis of the differences of Japanese and US companies in regard to management using IT, survey results (October 2013), State of “disruptive IT investment” by companies in Japan, survey results, (February 2015)
The Shape of IT in the Digital Era

- Urgent need for an approach to use ICT for value creation

**Shift to digital**
- Disruptive IT (Strengthening competitiveness)
- Mission-critical systems
  - Commoditization
  - TCO reduction
- Defensive IT
  - Modernization
  - Infrastructure migration
  - Rehost on cloud
- Systems that can respond to changes
- Internet
- Rehost on cloud
- Systems that bring about digital transformation
- Systems that connect SOR and SOE
- Systems that bring about new services
- Aggressive IT
  - Challenge in new areas
  - Comoditization

Waves of digital shift: Cloud, Mobile, Social, Sensor, Analytics

Digital shift

Maintaining the current state
Creating New Businesses through Disruptive IT Investment

- Expansion of new business areas
  - The appearance of engagement businesses, such as Airbnb and Uber
  - IT investment that leads to change and growth in new business areas, such as SoE, Fintech, and cross-industry business, is even more indispensable

- The burden of ICT expenditure
  - The necessity of IT investment in transformation and growth has been thoroughly recognized
  - Against a background of the burden of operating costs for existing systems, new investment is difficult

- The difference between market needs and technology
  - The necessary individual technologies are coming out one by one
  - Combining individual technologies is not properly meeting the needs of the market
Fujitsu’s Next-Generation Cloud-Based Digital Business Platform

- A platform that can achieve customers’ digital transformations
- Provides the most advanced ICT, such as the cloud, mobile, big data, IoT, and AI

### Existing information systems (SoR)
- Work efficiencies
- Cost reductions

### Digital transformation of business (SoE) and
- Transformation of existing business processes
- Creation of new products/services
- Ecosystem of multiple companies

**Links between SoR and SoE**

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**Digital Business Platform 「MetaArc」**

**AI** : Artificial intelligence  
**SoE** : Systems of Engagement (systems related to people or things)  
**SoR** : Systems of Record (systems that handle business processes and records)
Grand Design of Next-Generation Corporate Information Systems

- It is necessary to create a state of readiness in order to face the newest developments, and to make efforts at innovation easier.

![Diagram](image)
Product Composition of MetaArc

Platform Services

- Mobile SUITE
- Operational Data Management & Analytics
- IoT Platform
- AI
- Industry-specialized components, services and templates

Cloud services

- K5
- PRIMEFLEX for Cloud
- Compatible technology

Private cloud products

- Multi-cloud integration and management services

- RunMyProcess
- Cloud Services Management
- Hybrid IT Services

Other companies’ clouds (Oracle, Amazon...)

Policies

Fujitsu group internal cloud
New Cloud Platform K5, Core of MetaArc

**K5 ➔ K = Knowledge, 5 = the five continents**

- A new cloud service fusing Fujitsu’s experience with open-source technology
- Provides IaaS/PaaS that support SoR and SoE
- High-quality total support, safe for mission-critical systems

Fujitsu’s Experience
- System engineering development, operations experience
- System-wide applications

Open-source technology
- OpenStack
- Cloud Foundry

SoR (CRM, ERP, emails etc.)
Quality/productivity/links with existing environments

SoE (Big data, SNS, mobile etc.)
Speed/flexibility/using the most advance technology

FUJITSU Cloud Service K5
IaaS
PaaS

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Main functions of K5

In addition to system resource IaaS functions, K5 provides PaaS functions incorporating knowledge applicable to all sorts of systems, from SOR to SOE.

- **SaaS**
  - Shared layer for each industry/work task
  - **Service templates specific to each industry/work task**
    - Finance, retailing and distribution, manufacturing, etc.

- **PaaS**
  - **Business platform services**
    - Authentication, customer administration, contract administration, billing, forms administration etc.
  - **Technology component services**
    - Voice operability, biometric authentication, automated translation, etc.
  - **Matching business platform services**

- **Shared layer for business**

- **Application development and platform layer**
  - **API Management**
    - Safely making APIs public/analyzing usage conditions
  - **SoR** (Core business platform services)
    - Loosely coupling, data virtualization, anti-aging
  - **PF** (Cloud native platform services)
    - Development and execution environment based on Cloud Foundry
  - **SoE** (Automated system configuration services)
    - Configure, operate, convert software into packages, then distribute and deploy

- **Infrastructure and operations layer**
  - **SF** (Automated system configuration services)
  - **General-purpose components (RDB, e-mails, etc.)**
  - **System resources (openstack)**
Cloud Model Tailored for Customers

- A 4+1 product model, from public cloud to on-premises
  → Providing a model to fit security, performance and cost requirements
- Also providing products that can build a customer environment with the same architecture

Security (isolation)  Cost

Low  High

1. Public cloud (virtually shared)
2. Partially private cloud (virtually/physically dedicated)
3. Dedicated (dedicated cloud platform)
4. Dedicated on-premises dedicated cloud platform, set up in customer’s data center
5. Product sales

Fujitsu data center
Cloud services platform

Company A  Company B

Company C  Company D

Company E  Company F

Cloud services platform
Cloud services platform

Cloud Service platform  Cloud Service platform

Fujitsu remote monitoring, etc.

Customer’s data centers

K5

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24/7/365 Exhaustive Security Measures

- Operating 24/7/365, the cloud service platform implements information security measures such as vulnerability diagnosis and monitoring.

Strongly supported by Fujitsu Cloud CERT or the trusted status that is even more necessary for cloud environments

- **Vulnerability diagnosis**
  
  Fujitsu has established a security operations center (SOC). It carries out daily diagnoses of the K5 platform, linked with a patch management system.

- **Collecting, analyzing and managing vulnerability diagnoses**
  
  Fujitsu is constantly collecting vulnerability information on the cloud service platform, and reflecting that information in update and patch management on the basis of influence rate analysis.

- Fujitsu plans to successively apply a variety of standards and best practices, such as FISC/ISO 27001
Customer Value provided by K5

To grow while supporting the growth of our customers’ businesses, take on the dual task of “growing the existing business” and “creating new markets”

Digital Evolvable Apps
Creating platforms

SoR area

Supporting the growth of customers’ existing business

Digital Economy
Creating platforms

SoE area

Supporting the creation of new markets

K5
The First Step in the Evolution of Existing Systems

Migrating existing systems is difficult with other companies’ clouds.

Existing systems (custom/packages)

Cloud Enabled

Moving to the cloud is not the goal itself!

We have reduced the maintenance costs of infrastructure, but what about the maintenance costs of applications?

Strongly backing up our customers’ shift to the cloud with a variety of clouds

Able to provide a best practice-based multi-cloud environment

Shift to the cloud (MetaArc)

Individual infrastructure requirements

Office computers

Solaris

SAP

Nifty

Office computer cloud

U5 (Solaris)

A5 (Azure)

FLCP

K5

Office computers

Solaris

Individual infrastructure

On-premise

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Supporting the growth of customers’ existing business

The Direction of Evolution of Existing Applications

Evolution along three paths

- Becoming digital
  - Synchronized with business speed
- Decoupling
- Connectable
- Exposable
- Design-first
- Tailable
- AI
- IoT
- ... (Mash up)

Using K5-PaaS

- Evolvable
- Sustainable

Cloud Enabled

Application ownership limit

Cloud integration

Existing systems (custom/packages)

On-premise

Shift to the cloud

SaaS

Complete outsourcing

Service use (becoming a utility)

Including systems and tasks

Infrastructure layer

Outer limit of infrastructure ownership

Operational reform

Operational consistency

Becoming a service

Becoming digital

Digitalized

Using K5-PaaS

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A Digitalized World

Accelerate the digital shift of business by combining existing systems with digital technology and external services.

- Digitalized (Synchronized with business speed)
- Exposable
- Making APIs public
- Mash up
- Development combining a variety of APIs

Digital Evolvable Apps platform

PF service (Mission-critical systems platform)
API Management
CF service (Cloud native platform)
Supporting the creation of new markets

Base Models in Digital Business

- Creating value through increasing the sophistication of digital information and optimized matching
- Matching is the base model of digital business

Increasing the sophistication of digital information

- Digitized location information
- Digitized evaluation information

By increasing the sophistication of digital information, it becomes possible to make attribute information more detailed and to access it in real time (such as locational information and evaluation information)

Optimized matching through digital information

- When and where can cars be provided?
- When and where do users want to use a car?
- It becomes possible to optimally match a variety of needs with supply information on the basis of sophisticated digital information
Supporting the creation of new markets

**Digital Economy Platform**

- Platforms that support companies taking on the challenge of the matching business, which is the base model in digital business.

- I want to make my systems thoroughly prepared for growth.
- I want to quickly set up a matching business.
- I want to easily use a variety of technologies.

**Thorough business model support**

- Matching business platform services
- Business platform services

A structure that supports business models based on SoR experience.

**Providing a variety of technology components**

- Technology component services

A structure that provides a variety of technology components to mix and match.

Digital Economy Platform

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Contributions to Management by K5

You want to lower operating costs without lowering quality (without major system changes)

Your business is competing or growing (your system needs a competitive edge)

Investment in management

Internal systems

Business efficiencies

Modernization

Mission-critical systems

Competitive advantage

Investment in growth

Quality

Speed (CI/CD)

Moving model

Rehosting or SaaS

Short-term waterfall model

Connected with an API

Investment in transformation

Completely new services

New businesses (business interface)

Maintainability

Spiral up model

Small start, revenue sharing (reducing investment risks)

Initial Cost

Speed (Startup + CI/CD)

You want to create a new business (cannot predict system demands)
## Cloud Business Goals (Market Share in Japan)

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Fiscal 2014</th>
<th>Fiscal 2017</th>
<th>Fiscal 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>IaaS/PaaS</td>
<td>6%</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>SaaS</td>
<td>19%</td>
<td>22%</td>
<td>25%</td>
</tr>
<tr>
<td>Private cloud</td>
<td>22%</td>
<td>23%</td>
<td>25%</td>
</tr>
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</table>
Fujitsu Group’s internal systems inside and outside Japan are being completely overhauled to run on this next-generation cloud platform.

- Approximately 640 systems within the group (13,000 servers) will have been migrated – approximately JPY35.0 billion reduction in TCO over 5 years.
- The development experience gained in migrating internal systems to the cloud is being provided to customers as a reference, including tools, environments, etc.
Building Internal Systems Using the Public Cloud

- Using the public cloud (virtual private hosted) as much as possible

First Goal: Slimming down systems and reducing costs
(Enjoying the full benefits of the cloud)

- Using shared services
- Maximizing the effect of shared resources

Second Goal: Developing reference points from our experience and offering it to customers
(Pursuing the possibilities of the public cloud, giving added value to K5)

- Security guarantees
- Developing knowledge of using the public cloud
Enjoying the Full Benefits of the Cloud

Using shared services

Greatly reducing the burden of systems maintenance through the use of shared services

Currently systems (separately built)

System A Web/AP DB Monitoring
System B Web/AP DB Monitoring

Shared functions (cloud)

System A Web/AP DB Shared monitoring functions
System B Web/AP DB

Shifting to shared services and using shared services

Normally up to this point

System Z System Y System X
Web/AP DB

Slimming the system using shared services

Shifting to shared services when migrating

Maximizing the effects of shared resources

Fully enjoying the benefits of effectively using of resources and holding down costs by sharing resources with many users

Physical occupancy

Virtual occupancy

Availability zones
Pursuing the Possibilities of the Public Cloud

**Security guarantees**

Demonstrating that we can build and operate fully secure systems

- Achieving secure systems operations even in a physically shared environment connected to the internet

**Developing knowledge of using the public cloud**

Accumulating knowledge derived from using the public cloud and providing it to customers

Promoting complete migration of internal systems to the cloud

- By migrating the wide variety of Fujitsu’s mission critical systems, we accumulate knowledge of using the public cloud

- Currently - 65 systems
- Fiscal 2016 - 178 systems
- Fiscal 2017 - carrying out the vast majority of migration patterns
shaping tomorrow with you
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• Rapid technological change, fluctuations in customer demand and intensifying price competition in IT, telecommunications, and electronic device 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 impact of losses which may result from such transactions;
• Uncertainties 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;
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