Driving IT Innovation with Cloud Computing - the Taiwan Story

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2012.12.3
What is “Cloud Computing?”

- Why “Cloud?”
  - Cloud? “I am in the cloud.”
  - Internet (Massive collection of circuits)

- “Cloud” has become
  - A hype for stocks
  - A hat for budget demands

- What is “Cloud” really about
  - Open and shared information on network
Challenges

- New business model
  - Service levels, R&Rs
- Ownership
  - Sense of control
  - Budget/expense uncertainties
- Solution & Tools
- Security Concerns
- Bandwidth Concerns
- Financial models
- Green Data Centers
Drivers

• Someone else does it better and cheaper
  ✓ Outsourcing model
  ✓ Economy of scale

• Lack of system management skills
  ✓ System environment complexity
  ✓ Security concerns

• Under-utilized computing resources
  ✓ Hardware
  ✓ Software
Cloud Services

Outsourced business processes

Professional software

Middleware (DB and tools)

Server, storage hardware and system software

Salesforce.com
Google Doc, Gmail

Amazon EMR
Google Apps

Amazon EC2
Hinet HiCloud
**Big Data**

- In addition to IaaS, PaaS, SaaS, Data-as-a-Service (Data Harbour) will emerge as a new layer
  - GIS, CRM, ...

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### 5 Key Technology Enablers

1. **Mission Analytics**
   - World-class abilities to discover patterns, correlate information, understand plans and intentions, and find and identify operational targets in a sea of data.

2. **Widgets and Services**
   - A customizable, integrated and adaptive webtop that lets analysts, ops officers, and targeters to "have it their way".

3. **Security as a Service**
   - One environment, all data, protected and secure using common security services such as: ubiquitous encryption, enterprise authentication, audit, DRM, secure ID propagation, and Gold Version C&A.

4. **Data Harbor**
   - An ultra-high performance data environment that enables CIA missions to acquire, federate, and position and securely exploit huge volumes data.

5. **Cloud Computing**
   - Ruthlessly standardized, rigorously automated, dynamic and elastic commodity computing environment. Massive capacity ahead of demand. Speed for mission need.

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Source: CTOVision, What the CIA is up to, with CTO, Ira A. (Gus) Hunt, 2012. ITRI/ICL, 2012
Cloud Computing Strategy
Essential Ingredients for TW

**Value to Citizen**

**Enterprise & Economy**

**Application**
- Large-Scale, Open, and Re-engineered

**Platform**
- Big Data w. Distributed Processing

**Infrastructure**
- Economic and Energy-Saving HW/SW

**Innovation Coordination**
- Technical Skills
- Sales & Marketing
Our Strategies

Balance between Value and Economy

- Applications useful for citizens
- Develop expertise for applications
- Build foundation for system software
- Leverage local infrastructure
- Be GREEN!
Samples of Application

- from Medical Records to Personal Health Records
- Food traceability
  - Food safety
  - Add-value
- e-Invoice
- GIS and applications
- m-Police
- e-Government modules
Medical Record Exchange via Cloud

Unportable MR

MR catalogue in cloud

MR stays in the hospital
Gateway-based Exchange

- Gateway could be local- or cloud-based
A Step Forward
– Personal Health Record

- Health checkup info
- Healthcare info
- Personal gene info
- Family history
- ...
- (security and privacy!)
Benefits of Medical Cloud

- Promote the IT levels of hospitals
  - Make the IT level of hospitals more consistent
  - “Gateway Cloud” as the means to enable cloud

- Business opportunities for IT
  - Deeper understanding on medical domain

- Process re-engineering for hospitals
  - Conserve medical resources
Food Traceability

農產品履歷
查詢服務
系統
食品加工
履歷
查詢服務
系統
有毒物質
查詢
服務
系統

（跨單位資料動態整合）

農產品生產資訊
(農民/漁民)
檢驗資訊
(檢驗單位)
加工製造資訊
(食品/飼料廠商)
檢驗資訊
(檢驗單位)
物流零售資訊
(賣場/物流業)

食品履歷雲

農產品履歷
查詢服務系統
食品加工履歷
查詢服務系統
有毒物質
查詢服務系統

（設備）

這包米是花蓮富里鄉永續
農場貳兆炫達人YYMMD
生產，○○轅製包裝出廠
的特級銀川米...

原來這塊牛排是進口的美國德州去年的冷凍上等菲力牛肉...

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YYMMD生產的鮮奶，○○廠加工冷藏，○○公司運輸，YYMMDD上架，有效期間......

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生產，○○轅製包裝出廠
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原來這塊牛排是進口的美國德州去年的冷凍上等菲力牛肉...
m-Police

警政相片比對運算

關聯式分析運算

罪犯特徵值分析運算

犯罪地理資訊運算

雲端影像分析運算

維安雲端影音監控
Cloud Application Test-bed

- An open platform for 1-stop solution/tool trials
Ingredient of Test-bed

- Catalogue of solutions
  - Window into specifications and solutions

- Solution-Requirement matching
  - Try to match-up the best solution to a requirement

- Verification of methodologies
  - Pilot-run the implementation to verify validity of solution

- Technical supports and feedbacks
  - A window for technical supports during trials
  - Gather user feedbacks to solutions
Re-look IT in the age of Cloud
Challenging Topics

• Applications - Multi-tenant environment
  ✓ DB segregation and security
  ✓ Multiple management authority

• Domain sub-division
  ✓ Parallel processing for commercial applications

• DB
  ✓ Read-only: MapReduce, multiple copies
  ✓ Read-write: DB in shared memory

• Virtual systems
  ✓ Hypervisors
  ✓ Storage
Changing Market (I)

- **Data Centers**
  - Demands for capital-intensive investment
  - Technology for improved stabilities and energy efficiency
  - DCs become the wholesale window for solutions

- **Network providers**
  - Quality and quantity demands
  - Vertical integration with solutions/services

- **HW providers**
  - Branding or not?
  - New opportunities
  - Custom-designed features
Changing Market (II)

- **SW provider**
  - Standardization vs. customization
  - Complexity in management features
  - Decreasing revenue per customer
  - Shift of sales target
  - How to expand market: Internet marketing? Partners?

- **End-user**
  - Expectation of cost reduction
  - Managing more complex provider relation

- **Potentially growing market size**
  - Decrease of costs and ubiquitous network
  - Long-tail theory
Big Data / Open Data

- **Big Data**
  - Data mining into growing data sets

- **Open Data**
  - Government will release data via cloud services
  - Free when possible
  - Real estate site – a pilot
  - GIS-based data in more demand
Real Estate Website (non-official)

資料來源：http://real-price.appspot.com/
What ICT Industry Can Do (I)

- Leverage existing Iaas/Paas services
  - Amazon, Google Apps Engine, Microsoft, ...

- Build technology knowhow
  - Customer segregation, security, new type of data handling

- Deeper domain knowhow
  - Tax, education, medical, ...
  - Professional standards

- Search for new opportunities in Big Data, Open Data

- Synergy between HW/SW
What ICT Industry Can Do (II)

- Local to global
  - Leverage partner to go global
- Branding strategy
  - Branding / ODM / OEM
- Timing is everything
  - Technology – act now
  - Market – timing!!
Summary

- Taiwan is good at
  - Hardware (from PC to servers)
  - Niche software (ERP, e-government)
- Taiwan is NOT good at
  - Large-scale applications
  - Advanced software technologies
  - Global infrastructure (especially vs. China)
- What we can do
  - Build practical applications to demonstrate and reap value of Cloud
  - Leverage cloud application to build basic expertise
  - Seek market opportunities as appropriate: e-government, medical-IT, food industry IT, ...
Thank You, Q/A?