

## Security management in the Internet era

2<sup>nd</sup> Internet becomes infrastructure (1)  
October 7, 2010

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## Schedule

01st (09/30)	Course Description
02nd (10/07)	Internet becomes infrastructure (1)
03rd (10/14)	Internet becomes infrastructure (2)
04th (10/21)	Internet becomes infrastructure (3)
05th (10/28)	Diversity of risks & countermeasures about Information Systems
06th (11/04)	Guest Lecture
07th (11/11)	Security of individuals and society (1)
08th (11/25)	Security of individuals and society (2)
09th (12/02)	Midterm Presentation
10th (12/09)	Midterm Presentation
11th (12/16)	Cyber military superpower and its problem
12th (01/06)	Final Presentation
13th (01/13)	Final Presentation

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## Cloud Computing

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## Key Concepts of Cloud Computing

- Abstraction as a 'service'
  - SLA (Service Level Agreement) defines all
    - Any requirements
    - Risk requirements
- Services provided from the 'Cloud'
- Data management and storage are of the 'Cloud'
- All you need is a browser and the Internet

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## Examples of the 'Service Level'

### Availability

- 24hrs 365 days
- Disaster: Backup Data Center Switch within 24hrs
- Annual Versionup 2/Yrs

### Extensibility

- Customize-ability
- Interoperability with other systems
- Up to 50 simultaneous users
- Resources for 1TB, 4000 page view

### Reliability

- In core part of the services,
- Core System Down: recovery in 60mins
- # of down: 1/yr
- Report within 15min
- Type of info in the log

### Support

- Urgent Telephone: 24hrs/365 days
- Tech: Telephone for Office Hrs
- Email: 24hrs 365 days

### Performance

- Ave. response 3secs
- Max 1hr of 3secs delay
- Batch within 4hrs

### Data Mngmt

- Term for Backup kept
- Process of Deletion of data
- Insurance for data leakage
- Reliability by Multi outsource
- Data integrity

### Security

- Public authentication
- External evaluation
- Personal identification
- Encryption of network
- Audit report
- Security audit
- Tracability

Cloud Service Level

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## 砂上の楼閣 a castle in the air

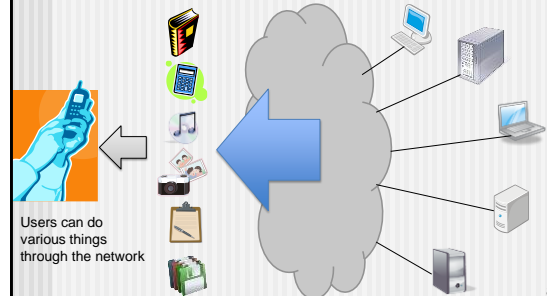
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## What is Cloud Computing

- "Cloud computing" is a common model of information services in which the scalable and often virtualized resources for computation & information processing are dynamically provided as a service over the Internet
  - Google CEO: Eric Emerson Schmidt (2006/8)
- Features of Cloud Computing
  - Sharing the data with other users on demand
  - Dynamic resource allocation & management
  - Hiding the physical configuration and locations of their network infrastructure, computing & storage devices.

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## Concept of Cloud Computing



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## Features of Cloud Computing

- Changing the general idea of hardware
  - A number of virtual hosts in one physical host
- Crossing the border
  - There are many places to save & backup information



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### Cloud Computing Services (1/3)

## SaaS (Software as a Service)

- Providing Software as a Service through the network
  - Google Apps (Gmail, Google Calendar, etc...)
  - MobileMe (Apple)
- Software & Data go to the network
  - Maintenance Free
    - Minimize the cost of implementations, buildings & managements
  - Flexible Architecture
    - Adjust resources to users, processes & duration in a short time
  - Customers can always use the most recent software & functions

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### Cloud Computing Services (2/3)

## PaaS (Platform as a Service)

- Providing application development & execution Platform as a Service through the network
  - Virtualized application servers & databases
  - Ex. Google App Engine  
<http://code.google.com/intl/en/appengine/>
- System goes to the network
  - SaaS + Developers' Environment
    - Providing execution environment that can run user's own system
  - Reduction of developers' overhead in aspects of scalability & productivity

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### Cloud Computing Services (3/3)

## IaaS (Infrastructure as a Service)

- Providing computing system Infrastructure as a Service
  - Ex. Amazon Web Services (Amazon EC2, Amazon S3) <http://aws.amazon.com/ec2/>
- Resources go to the network
  - Users can add resources on demand
    - Charge: usage of CPU & storage
  - Fully outsourced
  - Minimizing the cost for system development
    - Few OR no cost

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## Ex. Cloud Computing Service

- Many services use cloud computing
  - Gmail (mail service)
    - <https://mail.google.com>
  - Amazon EC2 (hosting service)
    - <http://aws.amazon.com/jp/>
  - NIFTY Cloud (hosting service)
    - <http://cloud.nifty.com/>
  - Dropbox (file sharing service)
    - <http://www.dropbox.com/>



→ Cloud promotes developments of a Internet society

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## Ex. Cloud Computing Applications

- [salesforce.com](http://salesforce.com) 
  - Japan Post Network Co., Ltd. 
    - Building the application in 2 months
    - 65,000 users in Japan
  - Eco-points 
    - Building the application in 3 weeks
      - Decision: 2009/6/1 → Service in: 2009/7/1
    - Claims: about 20,000,000
    - Busy period: 10 months

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## Advantages & Disadvantages of Cloud Computing

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## Advantages of Cloud Computing

- Uniform managements of the data
- Reduction of the costs for software management
- Widely various business community can use cloud computing
  - Business community which has no relationship with the Internet can easily use cloud computing services

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## Disadvantages of Cloud Computing

- More dependencies on service suppliers to implement data management
- More risk on information leakages
- Dependence of the supplier's availability factor
- Users cannot be aware of the network
- Vendor lock-in (will be described in next slide)

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## Vendor lock-in

- Matter
  - Once users use a cloud computing service, it is hard to change another cloud computing service
- Impact
  - Cannot change the service
    - To change the service, it takes much cost & prolonged arrest
  - Users are always under the thumb of the supplier
    - Users have to get succession machine & peripheral device
  - Violate the principle of fair competition

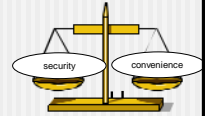
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## Security management in the cloud computing (How do we think?)

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## Why the security is needed

- (Not?) Best security
  - Disconnect from the network  
→ We cannot use the services...
- Trade-off between security and convenience
  - Business needs innovations
  - Innovation needs challenges
  - Security is not guaranteed in the challenging environment



We have to think about security risks in various views

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## 第1回課題 クラウドコンピューティング

- 昨今、クラウドサービスの一形態として、仮想マシンやネットワークなどのインフラをユーザに提供するIaaSが利用されている。そこで、IaaSにおけるリスクについて運用者側・利用者側の両視点から考察せよ。また、同時にそれらのリスクを解決・回避する方法についても考察せよ。
- 補足
  - レポートの分量はA4サイズ2枚程度とする
  - 経済面、法律面、技術面など様々な観点からの考察せよ
  - 良質なレポートについては、第4回講義の冒頭に発表してもらう
- 提出期限：10/18(月) 17:00(JST)
- 提出方法：SOIの課題提出ページ  
[http://www.soi.wide.ad.jp/report2000/rep\\_list.cgi?20100020](http://www.soi.wide.ad.jp/report2000/rep_list.cgi?20100020)

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## 1st Assignment Cloud Computing

Currently, IaaS (infrastructure as a Service) provides users with a computer infrastructure such as a virtual machine and global network connectivity, etc.

From their usage, make considerations about inherent risks from both the operator and the user perspectives. In addition, make considerations about methods to solve or avoid these risks.

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## 1st Assignment

- Additional Information
  - Submit at most 2 pages(A4).
  - Make considerations from a variety of perspectives such as economic, legal, technical and other aspects.
  - Students that handed in a good report will make a presentation of their report at the beginning of the fourth lecture.
- Deadline: 10/18(Mon) 17:00(JST)
- Submission: SOI submission page  
[http://www.soi.wide.ad.jp/report2000/rep\\_list.cgi?20100020](http://www.soi.wide.ad.jp/report2000/rep_list.cgi?20100020)

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## Reading List for Next Lecture

- HSPD-7: Critical Infrastructure Identification, Prioritization, and Protection
  - [http://www.dhs.gov/xabout/laws/gc\\_1214597989952.shtm#1](http://www.dhs.gov/xabout/laws/gc_1214597989952.shtm#1)
- 重要インフラの情報セキュリティ対策に係る第2次行動計画
  - [http://www.nisc.go.jp/active/infra/pdf/infra\\_rt2.pdf](http://www.nisc.go.jp/active/infra/pdf/infra_rt2.pdf)
- 重要インフラにおける情報セキュリティ確保に係る「安全基準等」策定にあたっての指針
  - [http://www.nisc.go.jp/active/infra/pdf/infra\\_pl09.pdf](http://www.nisc.go.jp/active/infra/pdf/infra_pl09.pdf)

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