Cloud Service Checklist for Research and Education

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National Institute of Informatics
The National Institute of Informatics (NII) seeks to advance integrated research and development activities in information-related fields, including networking, software, and content. NII also promotes the creation of a state-of-the-art academic-information infrastructure.
Collaboration and Promotion in Research and Education

Contents
- Promotion of academic information circulation and open access
- Collaborative promotion of institutional repository expansion

Cloud
- Enhancement of research and education environment by tailored cloud services
- Dramatic cost reduction

Federated ID management
- Collaborative enhancement of authentication between universities

Security
- Network flow analysis and dynamic control
- Raise of security level for SINET users

Network
- Nationwide 100-Gbps backbone network and scalable network expansion
- High-speed direct international lines to USA, Europe, and Asia
- Introduction of new technologies such as SDN in response to user needs
“Gakunin Cloud” is a generic name of NII’s services supporting cloud adoption and actual use for Japanese universities and research institutes.

https://cloud.gakunin.jp/

Collecting and sharing Information on selection, adoption, and use of cloud services.
Gakunin Cloud Adoption Support Service

NII’s activities to collect, disseminate, and share standard processes and information required when universities and institutes adopt and use cloud services.

Universities
Research Institutes

National Institute
of Informatics

Cloud
Service Providers

- Access to checklist responses
- Request for individual consultation
- Access to startup guide documents
- Attend cloud service seminars
- Others
  (sharing information, attend workshops, etc.)

* Bold letter services are available only for signed participants.

- Provide checklist responses
- Propose products and services for universities and research institutes
- Others
  (sharing information, attend workshops, etc.)

- Consider cloud adoption
- Develop specifications, procurement
- Verify checklist responses
- Conduct individual consultation, etc.
Participants (as of January 2021)

104 universities and institutes participate and use the service

Number of university and institute participants

- 35 Cloud providers provide responses to the cloud checklist. (Most of leading IaaS providers participate.)

- AZPower
- Dropbox Japan
- Fusic
- GMOInternet
- GRCS
- Imperva Japan
- Kaltura
- KDD Web Communications
- NTT Communications
- ServiceNow Japan
- Assistmicro
- Amazon Web Services Japan
- Eastgate
- Simul and Technical Communication
- Itochu Techno Solutions
- Exgen networks
- CloudAce (GCP reseller)
- ClassMethod
- NII
- Sakura Internet
- Salesforce.com
- Secioss
- Directcloud
- Topgate
- IBM Japan
- Oracle Japan
- Microsoft Japan
- Nekojarashi
- Fuji Xerox
- Fujitsu
- Fujitsu Cloud Technologies
- Hokkaido Telecommunication Network
- Hokkaido University Information Initiative Center
- McAfee
- Mirai Communication network
Cloud Checklist Ver.5.0

- Adapt to new technical requirements and service trends
  - Based on opinions from universities and experiences of developing use-case-oriented checklists
- Newly added checkpoints
  - Integration services, managed services, log analysis and threat detection, privacy policy
- Consolidation of multiple checkpoints

<table>
<thead>
<tr>
<th>Checkpoints</th>
<th># of detailed checkpoints</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Overview</td>
<td>4</td>
<td>Service name, service overview, etc.</td>
</tr>
<tr>
<td>B Historical records</td>
<td>2</td>
<td>Number of customers, service launch date, etc.</td>
</tr>
<tr>
<td>C Contracts</td>
<td>8</td>
<td>Payment method, license system, etc.</td>
</tr>
<tr>
<td>D Authorization/authentication</td>
<td>3</td>
<td>Shibboleth and Gakunin support, multi-factor authentication, etc.</td>
</tr>
<tr>
<td>E Availability/reliability</td>
<td>4</td>
<td>Service availability, planned outage, etc.</td>
</tr>
<tr>
<td>F Customer support</td>
<td>5</td>
<td>Help desk, support turnaround time, etc.</td>
</tr>
<tr>
<td>G Network and communication</td>
<td>9</td>
<td>SINET connection, network encryption, etc.</td>
</tr>
<tr>
<td>H Management functions</td>
<td>12</td>
<td>Dashboards, statistics, etc.</td>
</tr>
<tr>
<td>I Software environment</td>
<td>4</td>
<td>Supported software, software stack, proven applications, etc.</td>
</tr>
<tr>
<td>J Scalability</td>
<td>5</td>
<td>Resource limit, limit of number of instances, etc.</td>
</tr>
<tr>
<td>K Data center</td>
<td>7</td>
<td>Physical security, data center location, etc.</td>
</tr>
<tr>
<td>L Security</td>
<td>11</td>
<td>Security policy, incident response, etc.</td>
</tr>
<tr>
<td>M Data management</td>
<td>9</td>
<td>Data redundancy, log management, etc.</td>
</tr>
<tr>
<td>N Backup</td>
<td>6</td>
<td>Backup service, restore etc.</td>
</tr>
<tr>
<td>O Trustworthiness of provider</td>
<td>6</td>
<td>Subcontracting to third parties, personal information protection, etc.</td>
</tr>
<tr>
<td>P Terms and conditions</td>
<td>6</td>
<td>Responsibility sharing, liability for damages, etc.</td>
</tr>
<tr>
<td>Q Data administration</td>
<td>3</td>
<td>Rights of data usage, data sanitization, etc.</td>
</tr>
<tr>
<td>R Data migration</td>
<td>4</td>
<td>Support for data migration, compatibility of images, etc.</td>
</tr>
<tr>
<td>S Certification</td>
<td>4</td>
<td>Business continuity, security, etc.</td>
</tr>
</tbody>
</table>
Examples of Checklist Items

- Reliability

<table>
<thead>
<tr>
<th>Item</th>
<th>Question</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLA</td>
<td>Is service level agreement published?</td>
<td>the published value</td>
</tr>
<tr>
<td>Data durability</td>
<td>Is data durability is published?</td>
<td>the published value</td>
</tr>
<tr>
<td>Scheduled maintenance</td>
<td>Is scheduled maintenance planned?</td>
<td>the frequency and the average down time</td>
</tr>
<tr>
<td>Notification of</td>
<td>Is the procedure for notifying maintenance information published?</td>
<td>maintenance</td>
</tr>
<tr>
<td>maintenance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Data and log management

<table>
<thead>
<tr>
<th>Item</th>
<th>Question</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data redundancy</td>
<td>Are data redundantly stored?</td>
<td>methods for data redundancy</td>
</tr>
<tr>
<td>Access control (file)</td>
<td>Can the user configure access control for files?</td>
<td>methods of access control</td>
</tr>
<tr>
<td>Encryption</td>
<td>Are stored data encrypted?</td>
<td>methods for encryption</td>
</tr>
<tr>
<td>Log</td>
<td>Can the user access log files (e.g. a system log, a security log, an access log)?</td>
<td>a list of log files</td>
</tr>
</tbody>
</table>
## Examples of Checklist Items (cont'd)

### Data center

| Data center location | ✓ Is a country that hosts user data published?  
| ✓ the name of country |
| Data center location | ✓ Can the user designate a country or a region of datacenter to use? |

### Terms and conditions

| Governing law | ✓ Is the contract governed by and interpreted in accordance with the laws of Japan?  
| ✓ the name of country (if it is governed by a foreign law) |
| Jurisdiction | ✓ Is a court with jurisdiction determined?  
| ✓ the name of the court |

### Misc.

| SINET connection | ✓ Are DCs directly connected to SINET? |
| SAML | ✓ Authentication via SAML?  
| ✓ Gakunin ready? |
| Interoperability | ✓ Does the service provide APIs that have interoperability to other cloud services? |
Cloud Checklist Responses

- Cloud providers provide responses to the checkpoints based on the specifications and operations of their own services.
- NII verifies providers’ responses from the viewpoints mentioned below and provides the verified responses to participant universities and institutes.
  - Investigate evidences of descriptions
  - Maintain integrity of technical terms and granularity of description between providers
- Number of downloaded checklist responses (as of Jan 2021) **3,762**
  - Each participant downloaded almost once a month (by simple calculation).

![Number of downloads of the provider checkpoint responses]

**National Institute of Informatics**
Use-case-oriented Checklists

Current cloud checklist has more than 100 checkpoints.
- Comprehensive, but sometimes hard to use

Currently we are focusing on providing condensed checklists with related documents targeted to specific use cases:
- online meeting services
- BCP/DR
- genome research
- cloud procurement
- security policy
- HPC services
# Checklist for Online Meeting Services

- check items selected from the original checklist
- additional items related to functionalities of online meeting services

<table>
<thead>
<tr>
<th>Category</th>
<th>id</th>
<th>Detailed checkpoints</th>
<th>Response type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network and communication</td>
<td>G10</td>
<td>End-to-end encryption (E2EE)</td>
<td>Yes / No (with detailed description)</td>
</tr>
<tr>
<td>Software integration</td>
<td>OA1</td>
<td>LTI support</td>
<td>Yes / No</td>
</tr>
<tr>
<td></td>
<td>OA2</td>
<td>Integration with LMS (including proven cases)</td>
<td>Yes / No (with detailed description)</td>
</tr>
<tr>
<td></td>
<td>OA3</td>
<td>Integration of individual licenses</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Online meeting functionality</td>
<td>OB1</td>
<td>Maximum number of concurrent participants</td>
<td>description</td>
</tr>
<tr>
<td></td>
<td>OB2</td>
<td>Network bandwidth requirement</td>
<td>description</td>
</tr>
<tr>
<td></td>
<td>OB3</td>
<td>Video recording</td>
<td>Yes / No (with detailed description)</td>
</tr>
<tr>
<td></td>
<td>OB4</td>
<td>Attendance registration</td>
<td>Yes / No (with detailed description)</td>
</tr>
<tr>
<td></td>
<td>OB5</td>
<td>Attendance restriction</td>
<td>Yes / No (with detailed description)</td>
</tr>
</tbody>
</table>

**Responded services**
- Amazon Chime (published in July 2020)
- Cisco Webex Meetings (published in July 2020)
- Google Meet (published in July 2020)
- Microsoft Teams (published in July)
- NTT SMART Communication & Collaboration Cloud (published in May 2020)
- Zoom (published in August 2020)
Checklist for BCP/DR

- check items selected from the original checklist
  ✓ We defined 3 cloud usage scenarios for BCP/DR and selected items for each scenario.

### (1) cloud only
- **a. redundant system**
  - [ ] server control
    - [ ] failover
      - answer method: Yes / No [64.7%]
    - [ ] backup services
      - answer method: Yes / No [51.3%]
    - [ ] automatic backup
      - answer method: Yes / No [48.7%]
    - [ ] version management
      - answer method: Yes / No [48.7%]
    - [ ] backup to multiple datacenters
      - answer method: Yes / No [20.5%]
    - [ ] backup restore
      - answer method: Yes / No [46.2%]
    - [ ] security level of backup data
      - answer method: Yes / No [46.2%]

- **b. data backup**

### (2) hybrid
- **(1) cloud only**
- **(2) hybrid**

### (2) hybrid
- **(1) cloud only**
- **(2) hybrid**
Checklist for Genome Research

- new checklist for selecting/using suitable cloud services satisfying (data management) requirements
- assuming store/analyze human genome data on cloud

### requirements for cloud service providers

- show users the method to manage encryption key
- show users the method to remove data in un-recoverable way
- guarantee the removed data is un-recoverable (Issuing a certificate of data removal is preferred.)

### requirements for user

- confirm the method to manage encryption key provided by cloud service provider
- remove data in un-recoverable way using the method provided by cloud service provider

### checklist

- select a cloud service that satisfy service requirements
- use the cloud service following user requirements

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- Genomic Data Sharing Policy (NIH)
- Security Guidelines for Human Data (NBDC)
- Sample Security Regulations for Higher Education (NII)

- Ministry of Health, Labor and Welfare
- Ministry of Economy, Trade and Industry
- Ministry of Internal Affairs and Communications

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National Institute of Informatics
Activities Related to COVID-19

Collecting and disseminating information on university support programs by cloud provides to cope with COVID-19 (April 2020)
- Dropbox Japan, Assist Micro, AWS, Sakura Internet, SalesForce.com, Direct Cloud, IBM Japan, Oracle Japan, Fujitsu

Online meeting checklist (May 2020)

Online seminars and events (July 2020-)

Collecting experiences of cloud adoption in universities to cope with COVID-19 (September 2020-) such as:
- Short-term launch of an online education or telework environment
- Absorption of sudden increase of network and system loads and storage capacity
## Cloud Services with Special Support during COVID-19 outbreak

<table>
<thead>
<tr>
<th></th>
<th>Remote work/remote learning</th>
<th>Online meeting</th>
<th>File sharing</th>
<th>DaaS</th>
<th>Cloud resource (IaaS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dropbox Japan</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Assist Micro</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon Web Services Japan</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sakura Internet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Salesforce.com</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Cloud</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM Japan</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Oracle</td>
<td></td>
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<td>X</td>
</tr>
<tr>
<td>Fujitsu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

NII asked cloud service providers to provide information on special support and disseminates collected information to universities in Japan via NII web site now.
2020/04/01

Cisco and National Institute of Informatics support distance learning for universities, junior colleges, and colleges of technology across the country-
Cisco offers a 180-day free Cisco Webex Higher Education Special Support Program-

Cisco Systems GK (President and CEO: Dave West, Minato-ku, Tokyo, hereinafter Cisco) is a National Institute for Information Systems, National Institute of Informatics (Director: Yu Kitsuregawa, Chiyoda-ku, Tokyo, Japan). With the cooperation of NII), Cisco Webex system, Cisco Webex, is provided free of charge for 180 days as a basis for distance learning to universities, junior colleges, and colleges of technology (hereinafter universities) We offer special support programs for higher education institutions. Reception will start from April 6th.
2020/04/24

**NTT BizLink and National Institute of Informatics provide secure remote video conferencing services for employees of universities, research institutions, and medical institutions nationwide**

NTT BizLink Co., Ltd. (President: Takashi Oi, Head Office: Bunkyo-ku, Tokyo, hereafter NTT BizLink) is an inter-university research institution corporation National Institute of Informatics (Director: With the cooperation of Yu Kitsuregawa, Chiyoda-ku, Tokyo, NII), a faculty meeting/examination committee of faculty/researchers of universities and research institutes nationwide, a meeting dealing with sensitive information among medical staff of medical institutions, etc. , Provides video conferencing services for conferences that require secure execution from remote environments.
Summary

NII supports cloud adoption and use in Japanese academic community.

Cloud Service Checklist helps administrators to discuss cloud adoption and select suitable cloud services.

- The checklist Ver.5.0 is now available on the web site.
- Responses from 35 cloud service providers (passed reviews by NII) are available to registered administrators.
- NII developed use-case-oriented checklists: BCP/DR, online meeting, genome research ...

Actions to rapid increase of cloud adoption due to COVID-19

Acknowledgements

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