NATIONAL SECURITIES DEPOSITORY LIMITED

Technical Task Force Activity Report

15th General Meeting of Asia-Pacific CSD Group

November 2-4, 2011, Seoul, Korea

By

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SVP

NSDL - India

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AGENDA

NATIONAL SECURITIES DEPOSITORY LIMITED

- Technical Task Force Members
- Recent Surveys Conducted
- Activity in 2011
- Survey Results on Measures taken by CSDs and CCPs to reduce technology costs

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Technical Task Force Members

NATIONAL SECURITIES DEPOSITORY LIMITED

- CDBL, Bangladesh
- CDC, Pakistan
- CSE, Sri Lanka
- JASDEC, Japan
- KSD, Korea
- NSDL, India
- SD&C, China
- TDCC, Taiwan
- VSD, Vietnam

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Recent Surveys Conducted

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- Information Technology (IT) Governance in CSD
- New Demands on technology infrastructure
- Use of Mobile Technology in providing Depository Services
- Cross Border Linkages with other country/ countries
- Study of readiness of CSDs and CCPs in case of a Disaster

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ACTIVITY - 2011

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- 13th Cross Training Seminar at Mongolia
- Survey on Measures taken by CSDs and CCPs to reduce technology costs

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Cross Training Seminar

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Morning Session

- Topic – Readiness of CSDs and CCPs in case of a Disaster
- Moderator: National Securities Depository Limited
- Speakers
  - Central Depository Company of Pakistan Limited
  - Vietnam Securities Depository (VSD)
  - Japan Securities Depository Center, Inc.(JASDEC)

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Cross Training Seminar

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Breakout Session

- Topic - Initiatives taken by CSDs for maintaining investor relations
- Chaired : National Securities Depository Limited
- Speakers
  - BOI Shareholding Limited
  - Central Depository Company of Pakistan Limited
  - China Securities Depository and Clearing Corp. Ltd.

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Survey for ACG15

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Topics Proposed

- Measures taken by CSDs and CCPs to reduce technology costs.
- Capacity Planning by CSDs and CCPs with optimal costs.
- Assessment of maturity levels of security implementation by CSDs and CCPs.
- Measurement techniques to fine tune the performance of processes.
- Use of web-based technologies by CSDs.
- Technological challenges faced by CSDs.

Topic Chosen by Technical Task Force Members

Measures taken by CSDs and CCPs to reduce technology costs.

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Feedback received from 13 members

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- CCDC (China)
- CDBL (Bangladesh)
- CDC (Pakistan)
- HKMA (Hongkong)
- JASDEC (Japan)
- CJSC (Kazakhstan)
- JSCC (Japan)
- KSEI (Indonesia)
- NSDL (India)
- SD&C (China)
- TDCC (Taiwan)
- TSD (Thailand)
- VSD(Vietnam)

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Following are reviewed for cost reduction

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- Server Infrastructure
- Data Center
- Storage Infrastructure
- Application Development & Maintenance
- Platform Used for hosting the application

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For Server Infrastructure, Rating in terms of Importance (1- Lowest, 5 – Highest)

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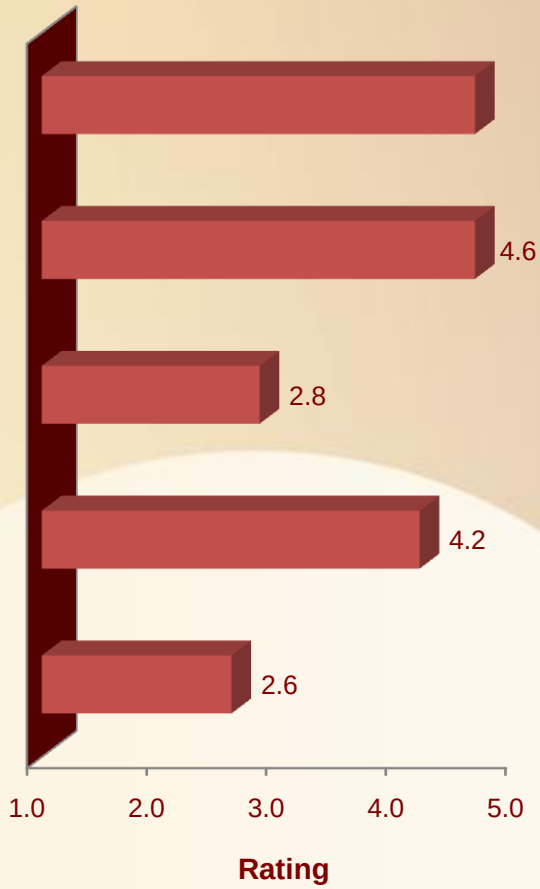
- Availability
- Security
- Headroom Capacity
- DR/BCP
- Overall Cost



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Platform used to host the database of central depository application

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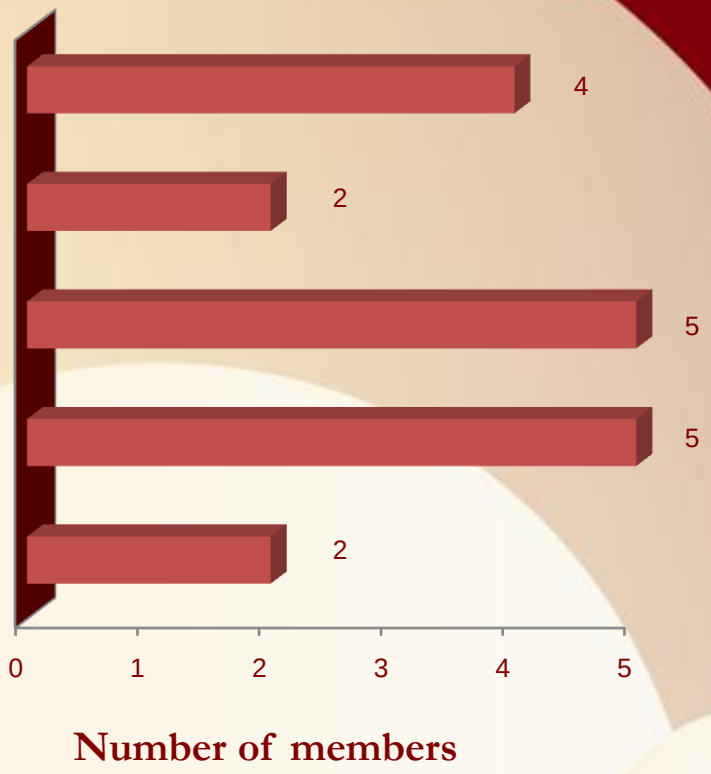
- Commodity Hardware with Microsoft Windows *
- Commodity Hardware with Linux
- RISC/EPIC servers with Unix
- Mainframe
- Others [*i.e. (I) Mid-range server with OS/400 (II) AIX*]



* Four members have selected multiple options of which 3 members have Windows plus some other platform

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Future Preference for Platform used to host the database of central depository application

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Existing	Future Preference	Number of Members
Mainframe	Commodity Hardware with Linux	1
Mainframe	RISC/EPIC servers with Unix	1
RISC servers with Unix	RISC servers with Unix	1
RISC/EPIC servers with Unix	Commodity Hardware with Linux	1
Mainframe and RISC/EPIC servers with Unix	Commodity Hardware with Linux	1
Mainframe	Mainframe	1

- One member has platform agnostic application

*** Only six members have replied**

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Average CPU Utilization – Central Depository Application

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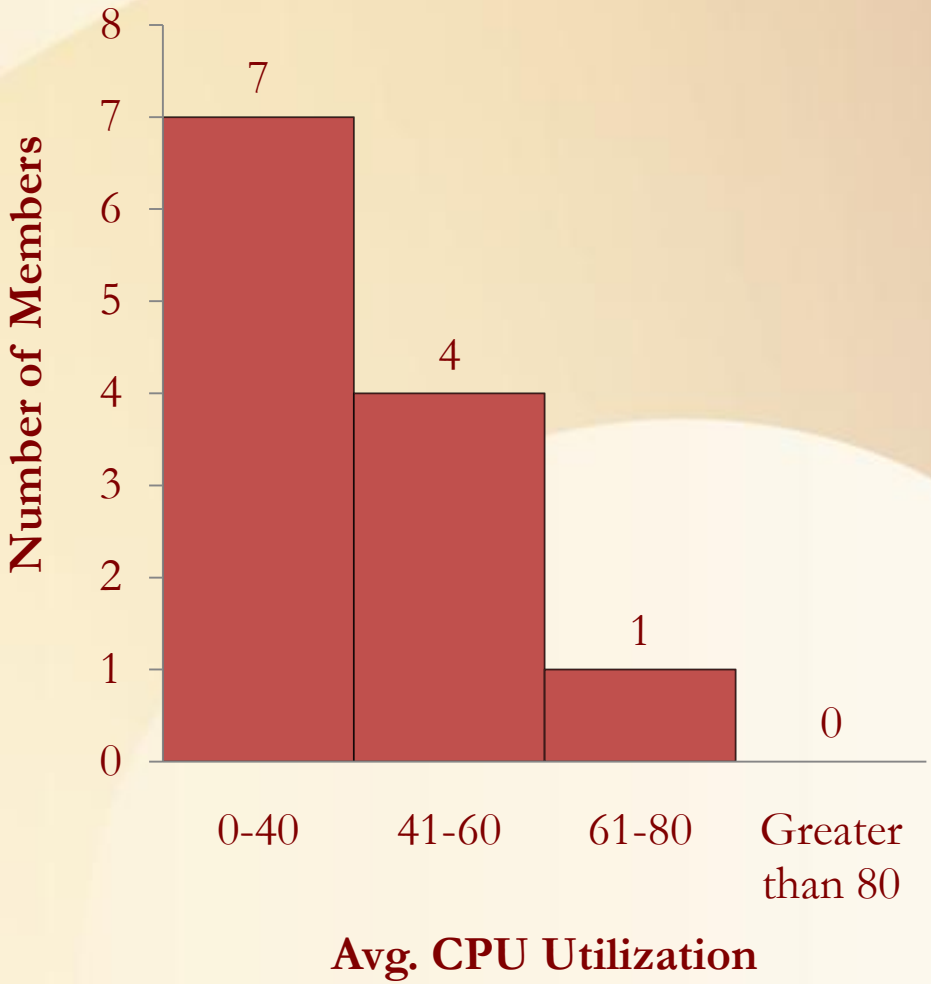

* One member has not replied to this question

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Peak CPU utilization

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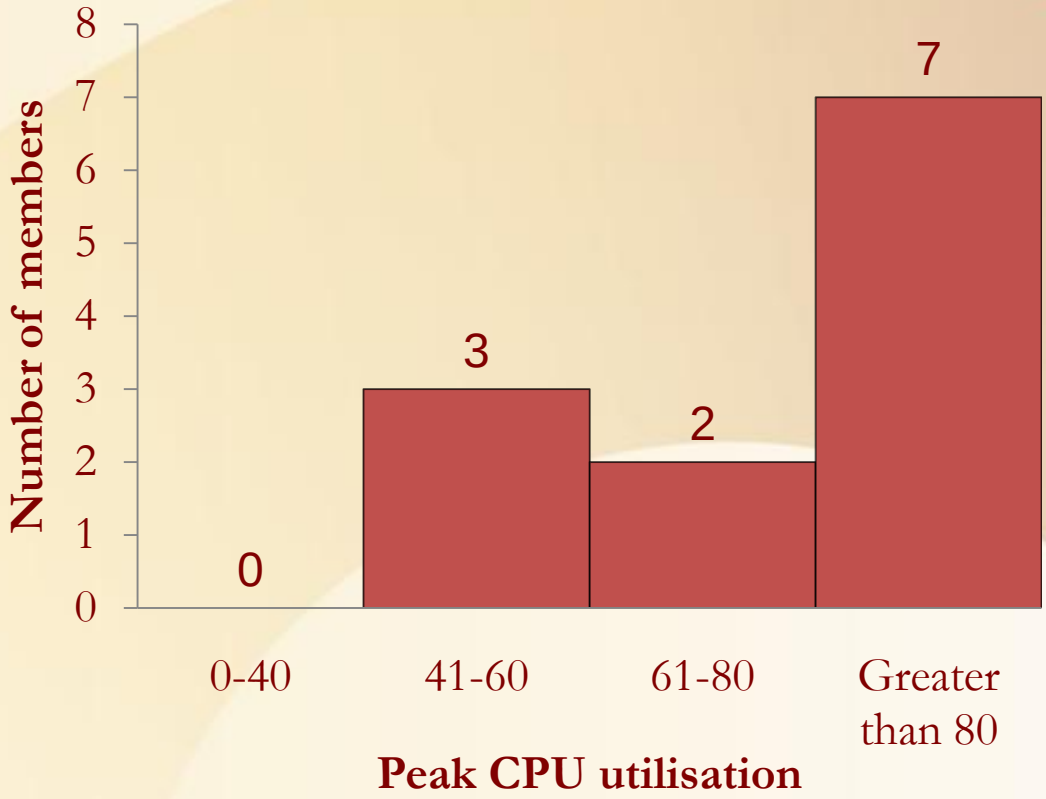

- One member has not replied to this question

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Headroom beyond peak utilization

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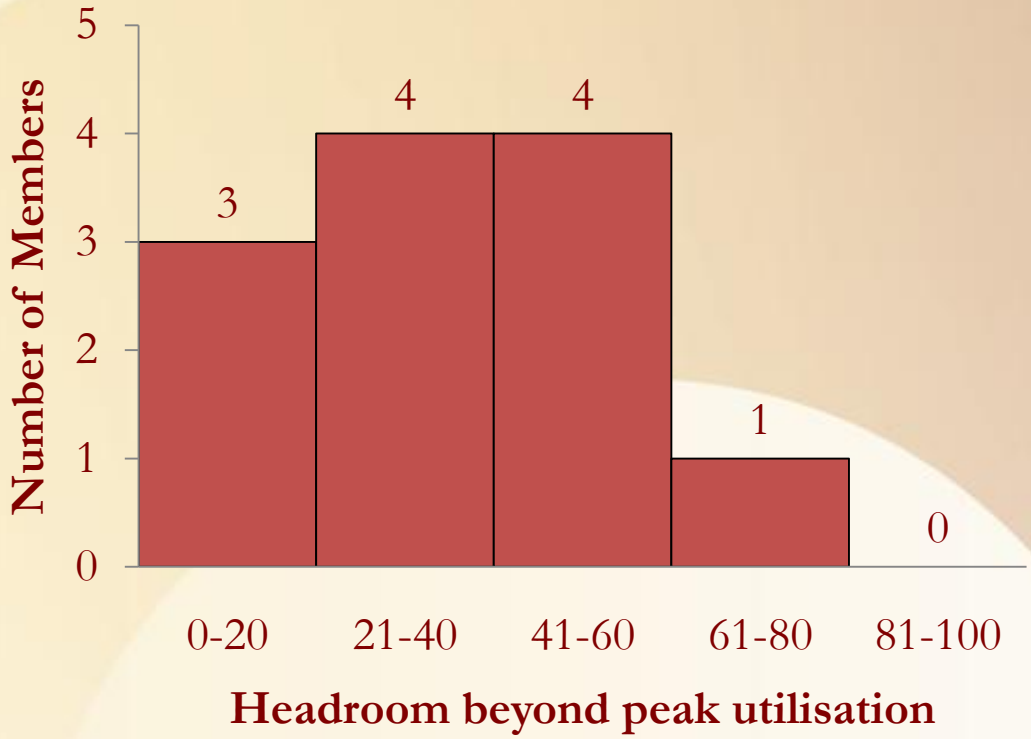

*** One member has not replied to this question**

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Type of Storage System for Critical Infrastructure

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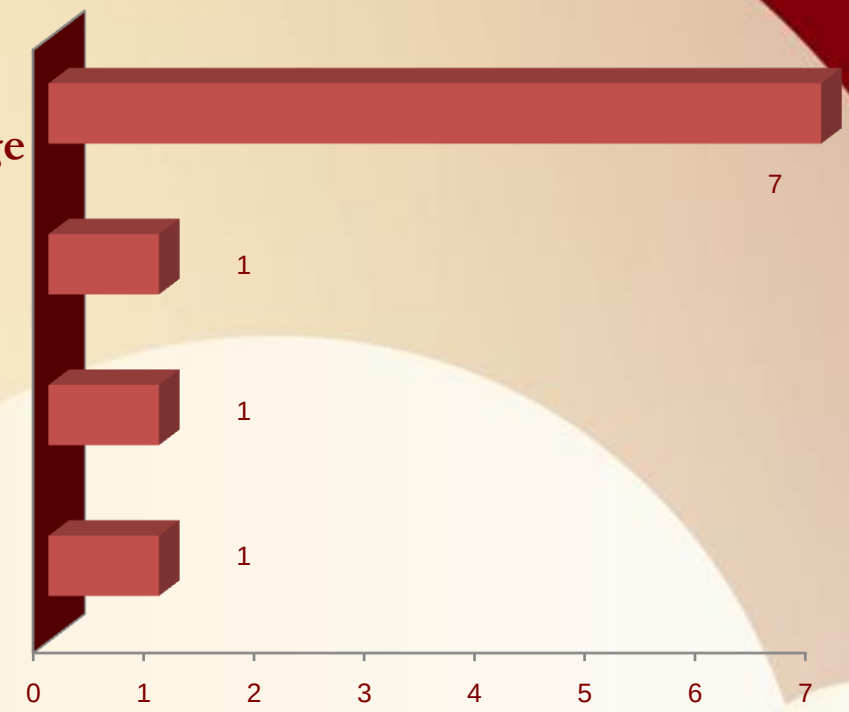
- Only Enterprise Class Storage
- Only Mid Range
- Enterprise class plus Mid Range
- Mid Range plus Low End



•Three members have not replied to this question

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Headroom for accommodating growth in Storage

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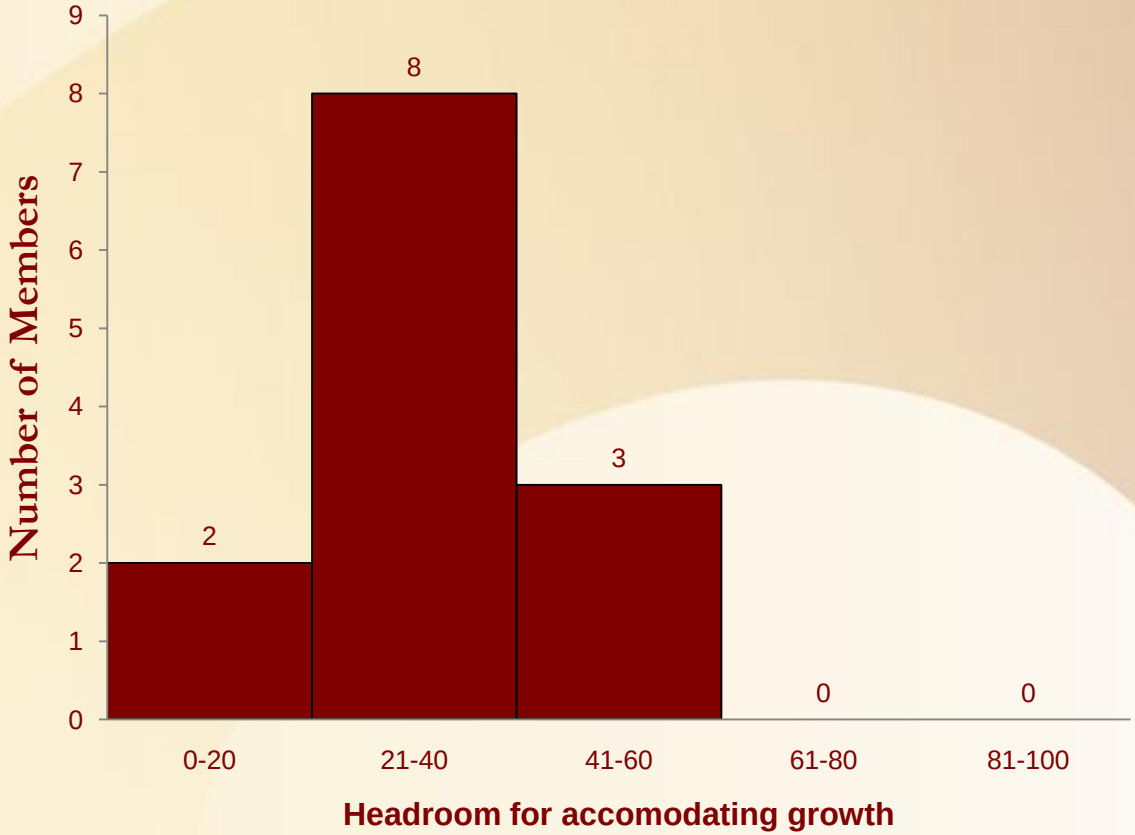

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Data Center Management

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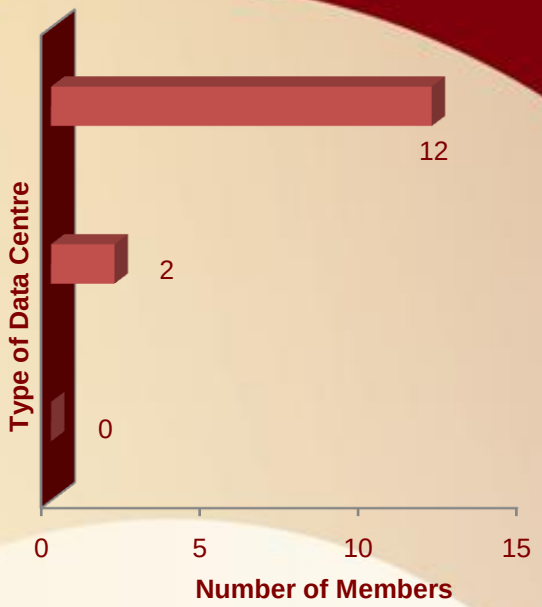
a. In – house

b. Outsourced to third party

c. Cloud Infrastructure (laaS) Provider



Future Preference for Data Center Management

- Five members have chosen to keep status quo (i.e. in-house)

•One member has given multiple answers (i.e. In-house and Outsourced to third party)

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Type of in-house data centre

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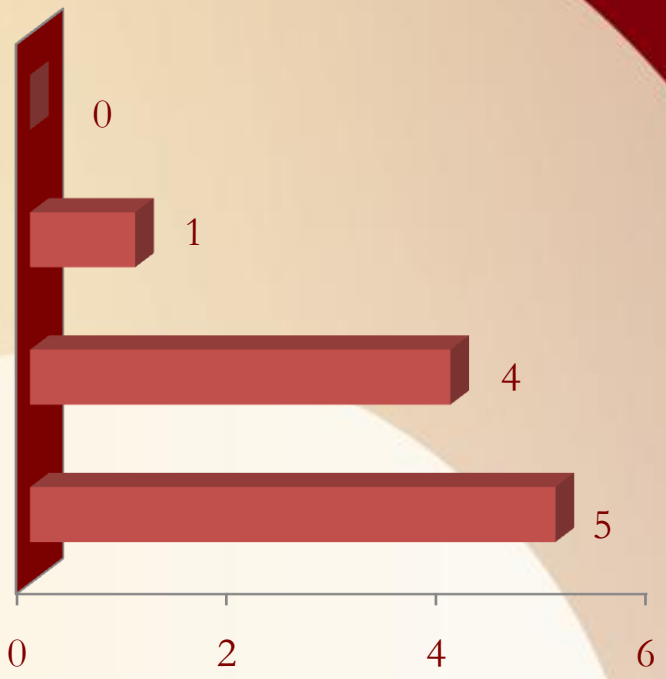
- Tier 1 = Non-redundant capacity components (single uplink and servers)
- Tier 2 = Tier 1 + Redundant capacity components
- Tier 3 = Tier 1 + Tier 2 + Dual-powered equipments and multiple uplinks
- Tier 4 = Tier 1 + Tier 2 + Tier 3 + all components are fully fault-tolerant including plinks, storage, chillers, HVAC systems, servers etc. Everything is dual-powered



Number of members

- One member has Tier 2++ data centre
- One member has not replied

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Future Preference for Type of in-house data centre

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Existing	Future Preference	Number of Members
Tier 2 ++	Tier 3	1
Tier 3	Tier 3	1
Tier 3	Tier 4	3
Tier 4	Tier 4	3

*** Only eight members have replied**

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Key factor driving the cost of data centre

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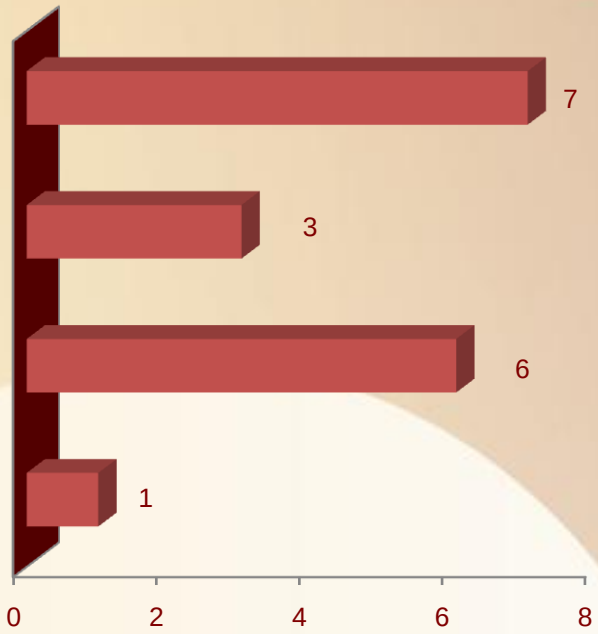
- Real estate
- Power and Cooling
- Infrastructure Management
- Manpower



* For 3 members, they have multiple 'key factors' driving costs

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Model of outsourced development

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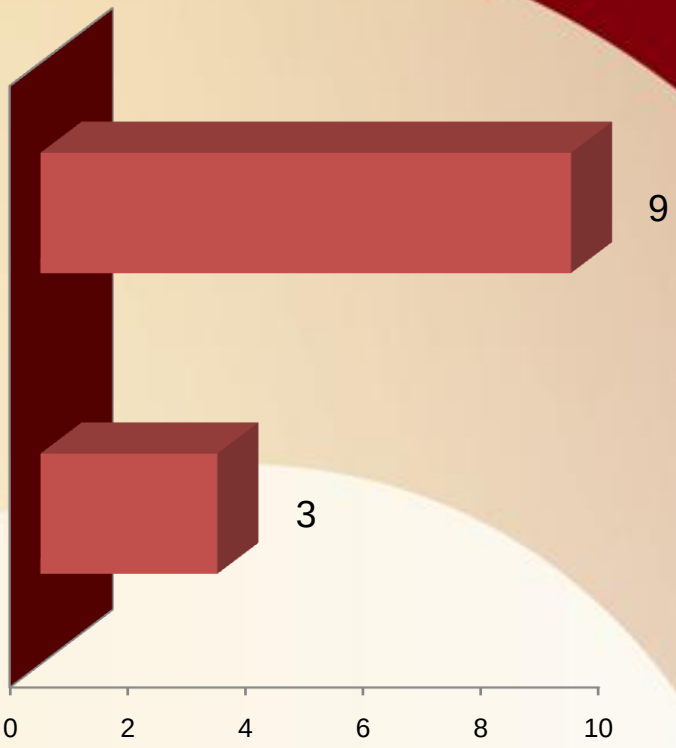
- On site development
- Off shore development



* One member has selected multiple options (i.e. both option)

* Two members have not replied to this question

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Future Preference for model of outsourced development

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Existing	Future Preference	Number of Members
On site development	On site development	7
Off shore development	Off shore development	1
Off shore development	On site development	1
On site development and Off shore development	On site development	1

* Only Ten members have replied

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Methodology used for Software estimation

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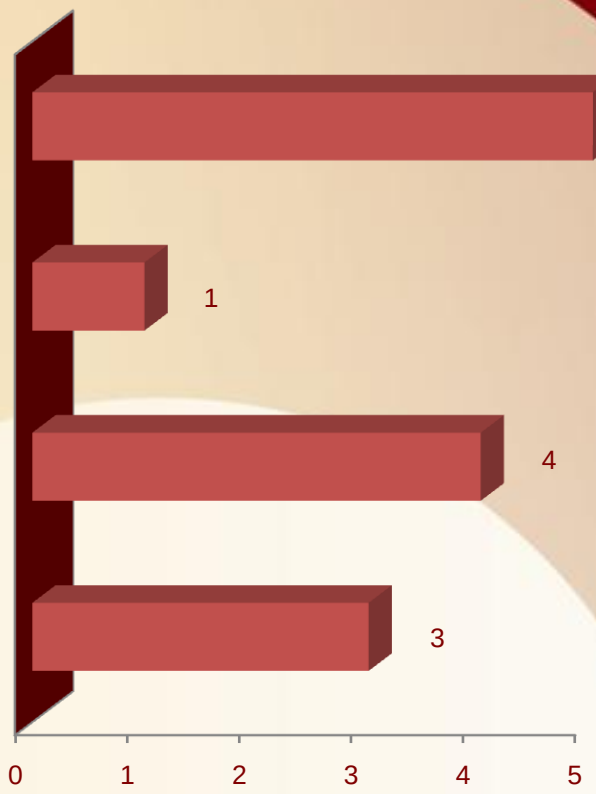
- Only Function Point Analysis
- Only Component Based
- Both Function Point Analysis plus Component based Analysis
- Any other



Number of members

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Size of application development and maintenance team

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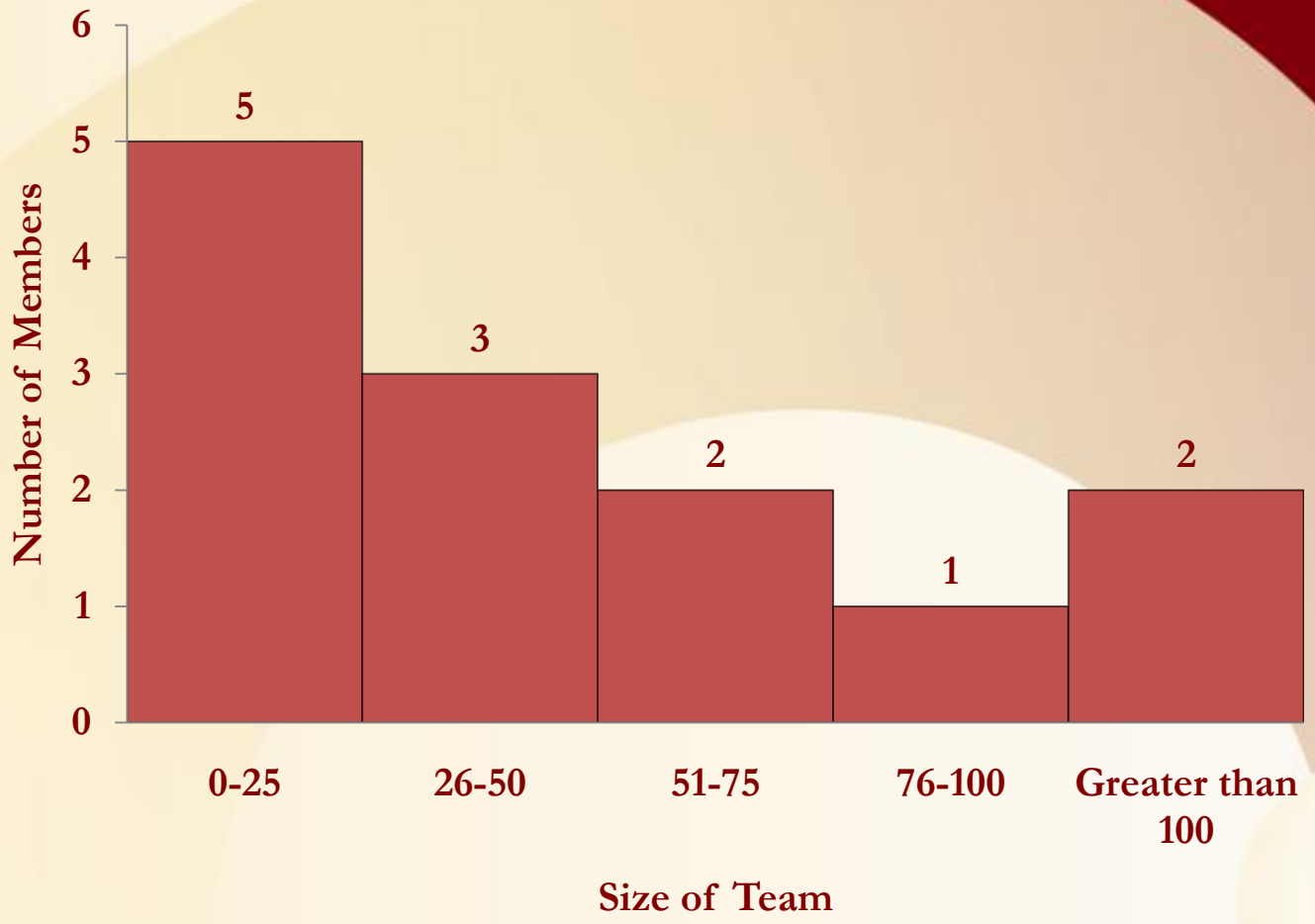

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Ratio of development and maintenance team

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Development Team	Maintenance Team	Number of Members
50	50	3
60	40	2
70	30	3
85	15	1
30	70	1
Common team is used for both tasks		1

- One member has not replied to this question and one member has not provided ratio

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Measures taken to reduce the technology cost

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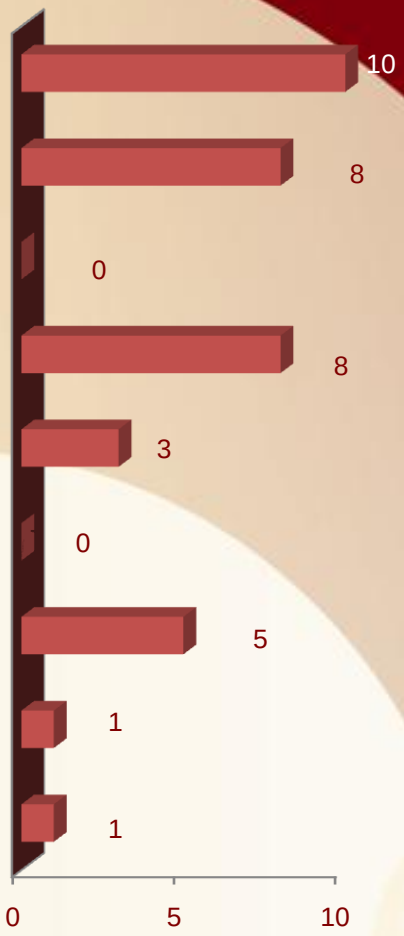
- Server Virtualisation
- Storage Consolidation/virtualization/de-dupe
- Cloud Computing
- Use of Open Source Software
- Platform and Database agnostic application
- Migration to Mainframe for Server Consolidation
- Migration from Mainframe to UNIX /Linux
- Migration from Unix to Linux on Commodity Hardware
- Other (i.e. Migration from MS Windows to UNIX/Linux)



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Options to reduce the IT cost:

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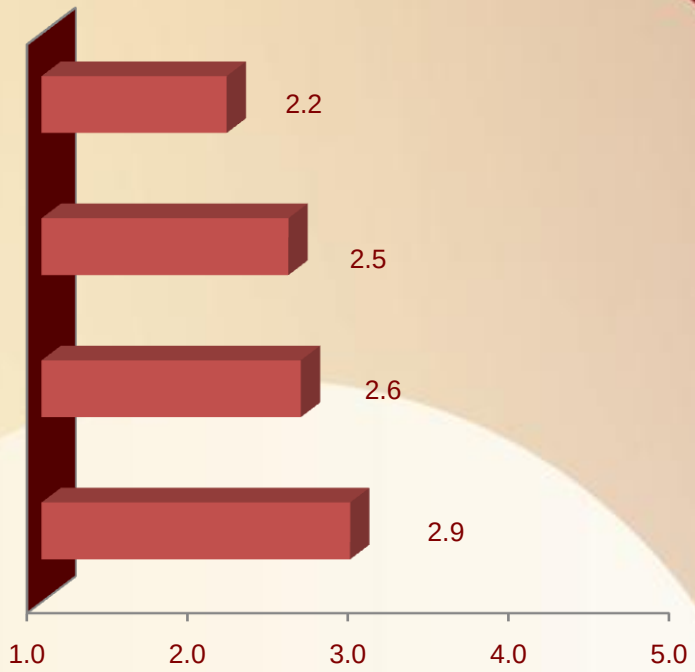
1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly Agree

- "cloud"-based storage
- "cloud"-based servers
- Application hosting on low cost hardware platform
- "cloud"-based software development environments



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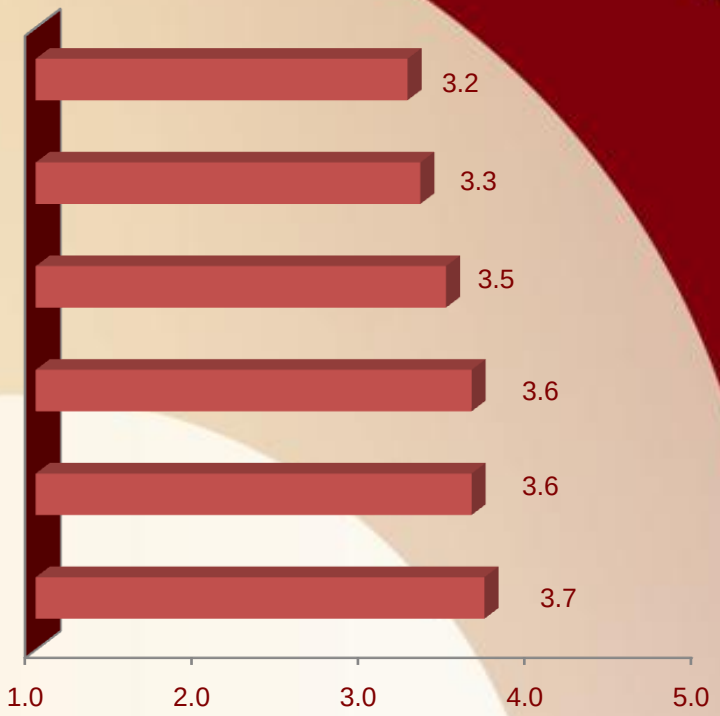
Options to reduce the IT cost:

NATIONAL SECURITIES DEPOSITORY LIMITED

1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly Agree

- Set up in-house Data Center vis-a-vis third-party data center
- Set up Private Cloud vis-a-vis Take services from Cloud Providers
- Hardware Infrastructure from Single Vendor vis-a-vis Multiple Vendors
- Use of open-source software
- Platform agnostic application (Portable Solution)
- In House vis-a-vis Contract with third party for application development and maintenance



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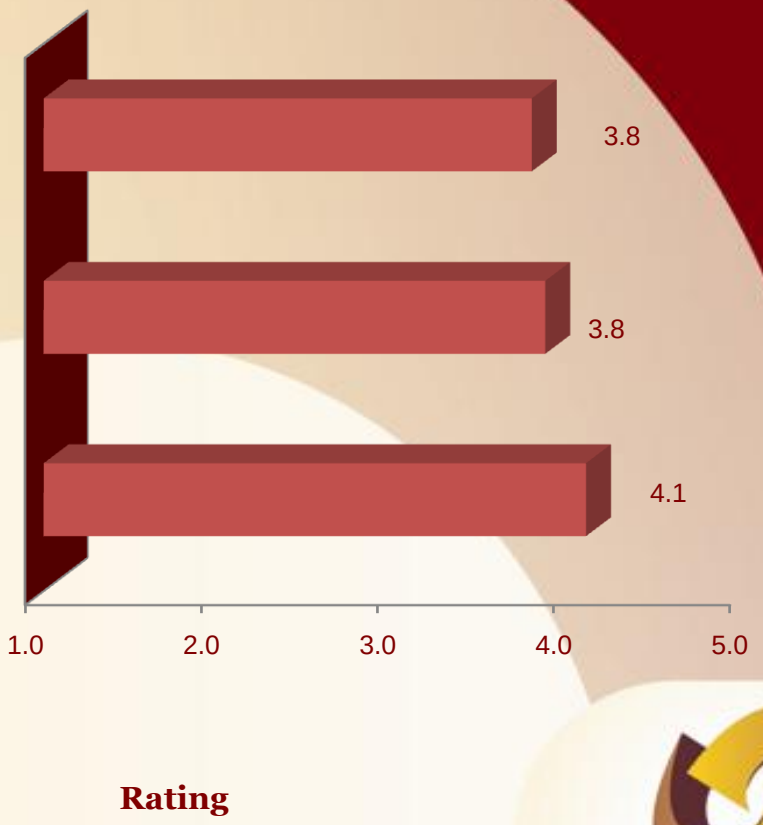
Options to reduce the IT cost:

NATIONAL SECURITIES DEPOSITORY LIMITED

1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly Agree

- Resource sharing e.g. using common hardware, storage, connectivity, support team in multiple process /projects
- Virtualization of servers
- "Using low cost storage systems for non-critical / archived data



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Thank You