Access Partnership

Panel Session 1:
Consolidating Data Centres into a Cloud-Enabled National Data Centre

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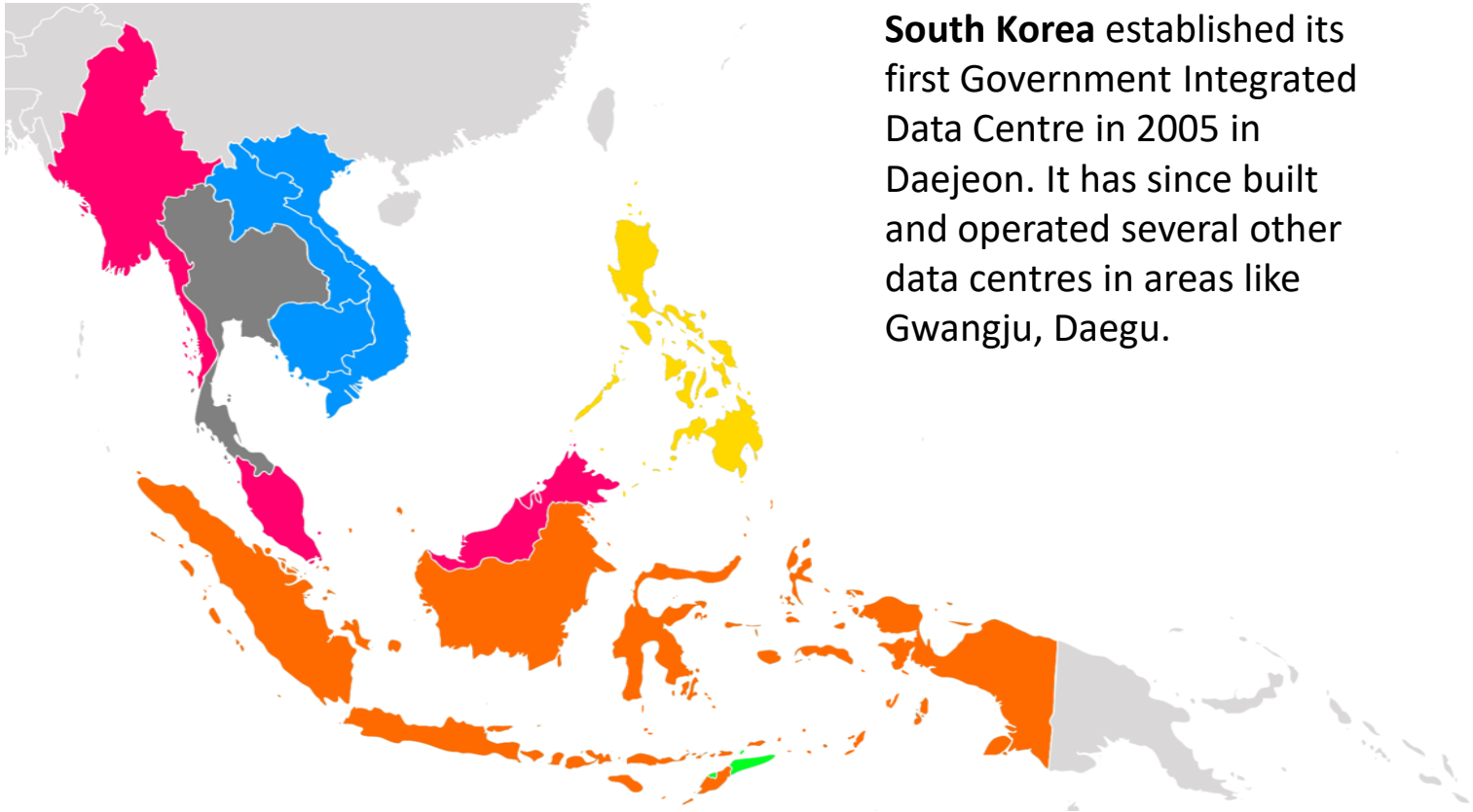
Data centre consolidation has been embarked upon by several governments in the region

Myanmar is looking to establish a national level data centre in Naypyitaw and a disaster recovery center (DRC) in Yangon, with all e-Government activities are expected to be integrated through this data centre.

The **Philippine** government has been operating its GovCloud since 2013 and had required all government agencies with existing data centres to be made part of the new GovCloud infrastructure.

Malaysia established its Public Sector Data Centre (PDSA) in 2011. To date, PDSA has installed more than 1000 servers for 120 agencies through PDSA centralised services.

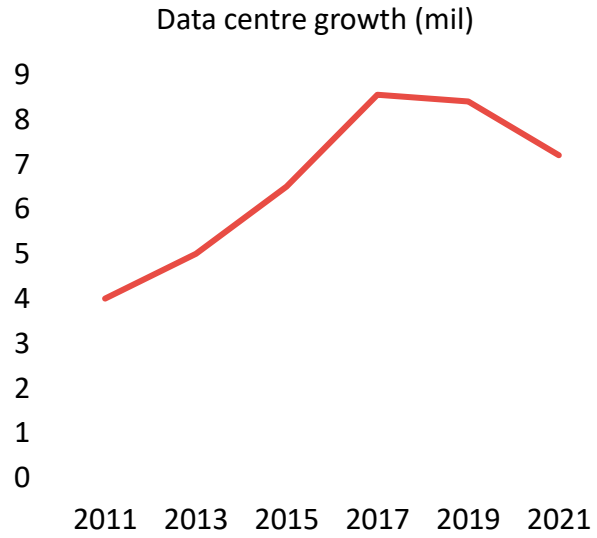


South Korea established its first Government Integrated Data Centre in 2005 in Daejeon. It has since built and operated several other data centres in areas like Gwangju, Daegu.

Indonesia is working towards establishing and operating its National Data Centre by 2023/2024.

Data centre consolidation journey

- **Initial** wave of consolidation virtualized existing infrastructure, helped reduce organizations' costs.
- **Second** wave of consolidation focused on reducing hardware footprint and accelerating virtualization adoption to deliver a cloud-like experience on-premises.
  - Create converged and hyper-converged IT infrastructures
  - ***Easier to virtualize, manage, scale, and do it all cost-effectively***
- With companies embracing virtualization, solid state storage, and cloud technologies, a **new** cycle of data centre consolidation is happening.
  - The technologies, along with the move to SaaS, are highly deflationary when it comes to the need for IT hardware (and space) in existing data centres.
  - Companies embracing cloud are eliminating the pressure from new workloads to build new data centres.



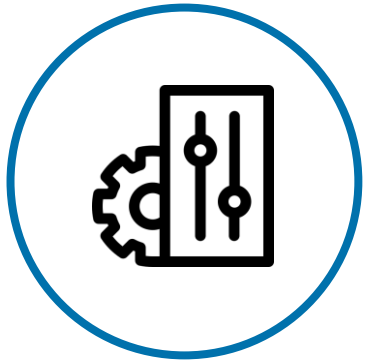
Data centre growth was increasing globally up until 2015, when it started tapering off.

Rather than consolidating smaller data centres into bigger ones, companies can now (i) consolidate small and large data centres into smaller ones or (ii) opt out of owning data centre space altogether and rent space in a colocation facility that has newer infrastructure.

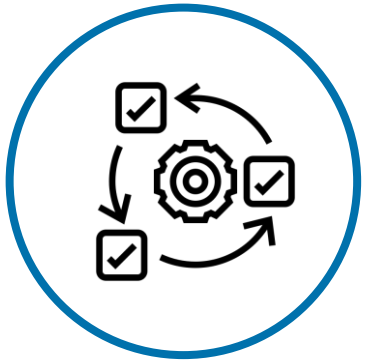
Advantages of Data Centre Consolidation

Cost Reductions

Improved Security



Increased Control



Improved Agility

Better Disaster Recovery

Compliance

Delivering services at cloud-scale requires a conceptually different approach to designing, building, deploying, and operating data centres.

There are a significant amount of design points that contribute to the differences between enterprise IT and cloud-scale infrastructures:

- Number of customers to be serviced
- Quality of data to be hosted
- System administration and operation
- Network design
- Hardware reliability
- Security
- Architecture
- Supply chain

Cloud-Based Data Centres

At cloud-scale, there are three laws of operations that organisations need to assume:

1. Hardware will fail
2. Software will have bugs
3. Humans will make mistakes

However, it is possible to take advantage of every aspect of the physical environment – from server design to the building itself – ***to drive systems integration for greater reliability, scalability, efficiency, and sustainability.***

Considerations when designing Cloud-Scale Data Centres

- Define the entire environment as an integrated ecosystem rather than independently designing a data center, a network, spec servers, and management software

- Reduce hardware redundancy by focusing on a total cost of ownership (TCO) model-driven metrics like performance per-dollar per-watt, not just cost per megawatt or transactions per second

- Aim to utilise virtualisation technologies to facilitate users' movement of application workloads around machines and data centres – how workloads are placed on top of data center, server, and network infrastructure can make a significant difference in service resiliency and availability

Characteristics of **Resilient** Cloud-Enabled Data Centres

- Presence of **failure domains**, i.e., physical or logical sectioning, allows distinct workloads to be placed on top of them and prevents the entire ecosystem/environment from being negatively affected when a critical device or service experiences problems
- **Full stack integration**, where the software applications are multi-way, Active/Active applications that can shed a load and move it to other failure domains or data centres.
- A **single management framework** that covers the electrical, mechanical, controls, networks, and servers to allow greater insight into the operation and performance of the system as a whole.
- **No emergency back-up generators** are needed as the systems and applications running in them are software resilient. In the event of a broad utility-level failure, workloads can be moved to another data centre without impact on end-user performance.
- **Energy-saving**, e.g., rack-level fuel cells to power the server infrastructure, essentially collapsing the entire electricity supply chain to sit inside the rack itself, reducing electricity loss from point of generation to data centre (and hence cost) and reliance on other components in the energy supply chain.

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