Google Cloud Platform for Data Center Professionals

This guide is designed to equip professionals who are familiar with data centers and colocation facilities with the key concepts required to get started with Google Cloud Platform. The guide compares Cloud Platform with the software, hardware, and best practices used in those facilities, and highlights the similarities and differences between the two. In addition, the guide provides quick-reference mappings of traditional data center products, concepts, and terminology to the corresponding products, concepts, and terminology on Cloud Platform.

Why Google Cloud Platform?

Most companies use data centers because they offer cost predictability, hardware certainty, and control. However, running and maintaining resources in a data center also requires a lot of overhead, including:

- **Capacity:** enough resources to scale as needed, and efficient use of those resources.

- **Security:** physical security to protect assets, as well as network- and OS-level security.

- **Network infrastructure:** components such as wiring, switches, routers, firewalls, and load balancers.

- **Support:** skilled employees to perform installation and maintenance and to address issues.

- **Bandwidth:** suitable bandwidth for peak load.

- **Facilities:** physical infrastructure, including equipment and power.

Fully featured cloud platforms such as Cloud Platform help remove much of the overhead surrounding these physical, logistical, and human-resource-related concerns, and can help reduce many of the related business costs in the process. Because Cloud Platform is built on Google's infrastructure, it also offers additional benefits that would typically be cost-prohibitive in a traditional data center, including:

A global network

Google has one of the largest and most advanced computer networks. Google's backbone network has thousands of miles of fiber optic cable, uses advanced software-defined networking, and has edge-caching services to deliver fast, consistent and scalable performance.

Built-in, multi-regional redundancy

Multiple data-center regions and zones across the globe help ensure strong redundancy and availability.

Fast, dependable scaling

Cloud Platform is designed to scale like Google's own products, even when you experience a huge traffic spike. Managed services such as Google App Engine, Google Compute Engine's autoscaler, and Google Cloud Datastore give you automatic scaling that helps your application to grow and shrink its capacity as needed.

The following sections discuss the major benefits of using Cloud Platform over a traditional data center environment.

Capacity and bandwidth

In a traditional data center, you have to plan out your resource needs, acquire enough resources up front to scale as needed, and manage your capacity and workload distributions carefully within those resource limits. Due to the nature of pre-provisioned resources, no matter how carefully you manage your capacity, you may end up with suboptimal utilization:
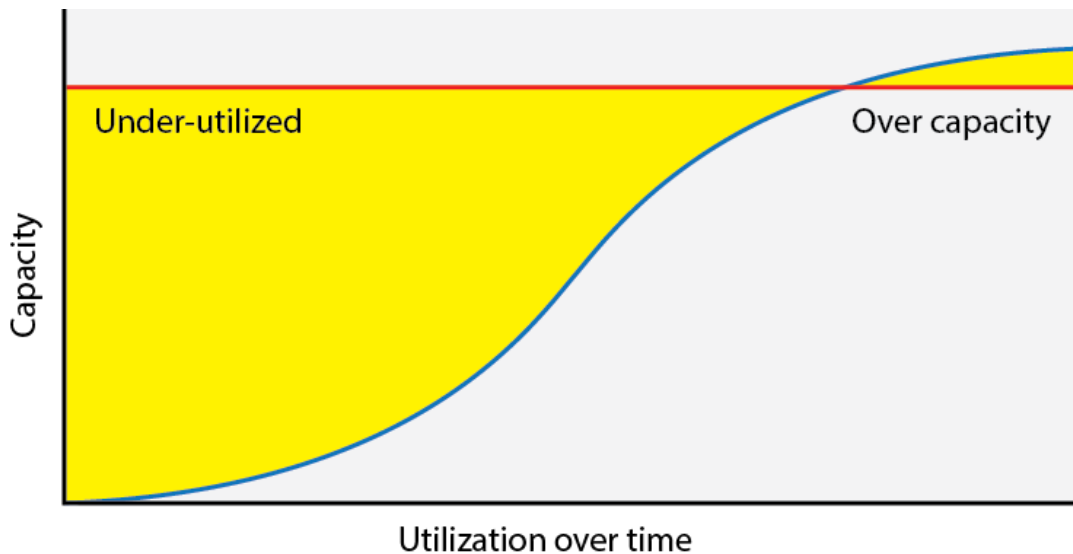
Figure 1: Utilization of pre-provisioned resources over time

In addition, this pre-provisioning of resources means that you have a hard ceiling on resources. If you need to scale beyond that, you're out of luck.

Cloud Platform helps resolve many of these utilization issues and scalability thresholds. You can scale up and scale down your VM instances as needed. Because you pay for what you use on a per-second basis, you can optimize your costs without having to pay for excess capacity you don't need all the time, or need only at peak traffic times.

Security

The Google security model (https://cloud.google.com/security/#google_security_model) is an end-to-end process, built on over 18 years of experience focused on keeping customers safe on Google applications like Gmail and Google Apps. In addition, Google's site reliability engineering teams oversee operations of the platform systems to help ensure high availability, and prevent abuse of platform resources.

Network infrastructure

In a traditional data center, you manage a complex network setup, including racks of servers, storage, multiple layers of switches, load balancers, routers, and firewall devices. You must set up, maintain, and monitor software and detailed device configurations. In addition, you have to worry about the security and availability of your network, and you have to add and upgrade equipment as your networking needs grow.

In contrast, Cloud Platform uses a software-defined networking (https://wikipedia.org/wiki/Software-defined_networking) (SDN) model, allowing you to configure your networking entirely through Cloud Platform's service APIs and user interfaces. You don't have to pay for or manage data-center networking hardware. For more details about Google's SDN stack, Andromeda, see the Enter the Andromeda zone (https://cloudplatform.googleblog.com/2014/04/enter-andromeda-zone-google-cloud-platforms-latest-networking-stack.html) blog post.

Facilities and support

When you use Cloud Platform, you no longer need to worry about installing or maintaining physical data-center hardware, nor do you need to worry about having the skilled technicians to do so. Google takes care of both the hardware layer and the technicians, allowing you to focus on running your application.

Compliance

Google undergoes regular independent third-party audits to verify that Cloud Platform is in alignment with security, privacy, and compliance controls. Cloud Platform has regular audits for standards such as ISO 27001, ISO 27017, ISO 27018, SOC 2, SOC 3, and PCI DSS.

Affordability

Cloud Platform's pricing model is designed in the spirit of Moore's Law. For more information, see Pricing Philosophy (https://cloud.google.com/pricing/philosophy/).

What's next?

NEXT: NETWORKING ON CLOUD PLATFORM (HTTPS://CLOUD.GOOGLE.COM/DOCS/COMPARE/DATA-CENT

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