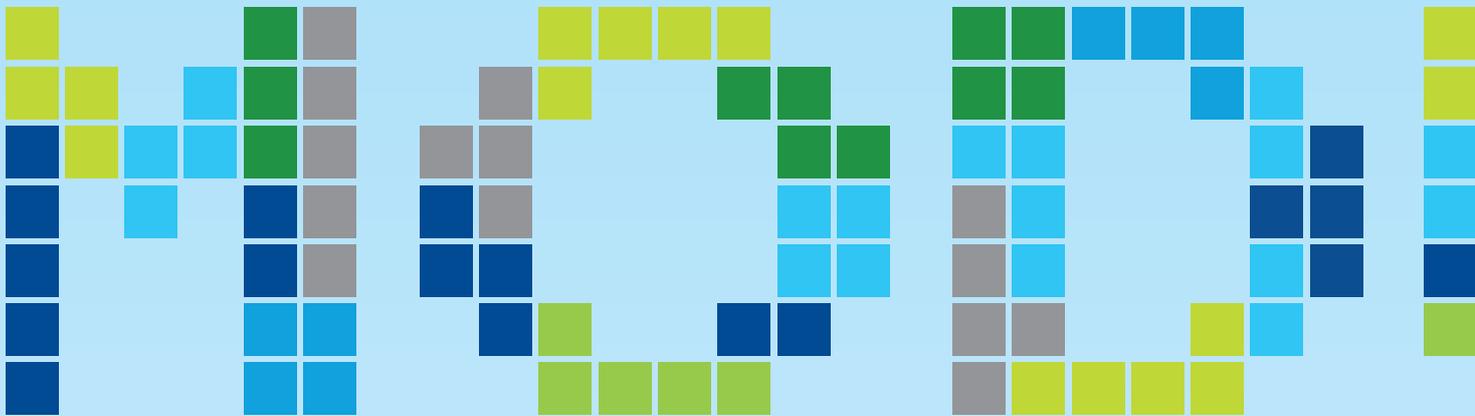


MOVING FROM TRADITIONAL SILO-BASED DATA CENTERS TO



COMPUTE-CENTERS FOR INCREASED BUSINESS ENABLEMENT

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Competitive advantage is not permanent, as many organizations have painfully experienced, and the search for it has frequently proved unfruitful. If successful, the advantage often only lasted a short while. If competitive advantage is to be lasting in this new digital era, where disruption is a constant factor, businesses must build and ensure a stable yet flexible technology platform, which can easily adapt to future business needs and requirements. Creating such a technology platform must be considered a hygiene factor for future business success and absence of adequate technology services a thing of the past.

Organizations that do this first will have a real opportunity to focus on developing their business proposition and not on dissatisfactory ICT services. In turn, this can offer a foundation for (business) innovation and a real competitive advantage.

At the core of these services is the data center with all its technological complexity and security constraints. Getting ready for the next generation of DCs will prove critical for every organization, large or small, private or public, if they are to thrive in the insights-economy.





Introduction

Gordon Moore defined his prediction in 1965, which observes that over the history of computing hardware the number of transistors in a dense integrated circuit has doubled approximately every two years. Mark Kryder's projection observed later that magnetic disk areal storage density was increasing with a pace much faster than the two-year doubling time of semiconductor chip density posited by Moore's law. The doubling period was around 18 months. Furthermore, Butler described the amount of data coming out of an optical fiber as doubling every nine months, thus, excluding transmission equipment upgrades, the cost of transmitting a bit over an optical network decreases by 50 percent every nine months.

On the basis of these "laws," the technological evolution has been staggering and the changes in our lives enormous over the past decades. Technology now pervades our lives and almost nothing we do would be possible without this "technology revolution."

For companies and organizations, the implications have also been drastic, and almost every industry has changed dramatically as a result. At the core of these changes is the data center. The model used when discussing data centers includes everything from facilities, through computing & storage and network capabilities, and ends with security and IT operations.

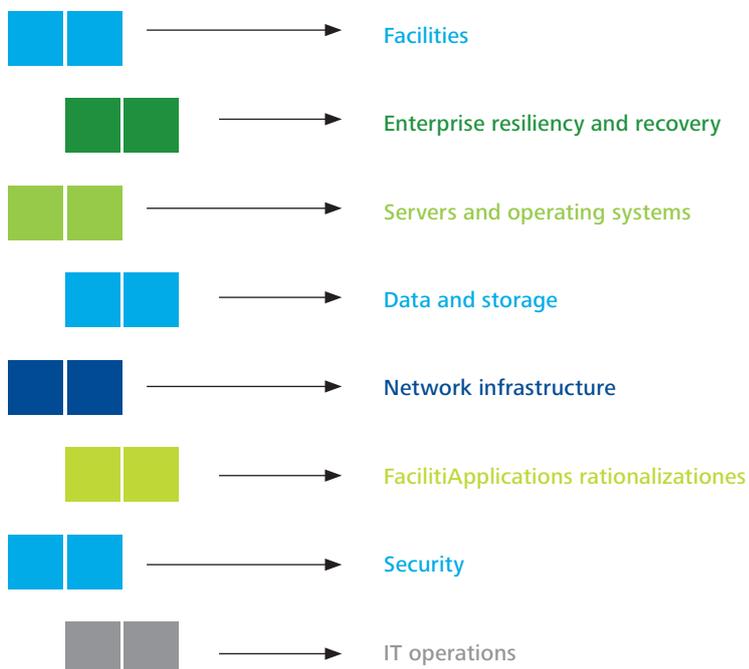
Data center progression

The "vertical DC" is the initial data center structure where organizations and companies locate their costly computer equipment in a classic silo-based approach. Each system, or application, is contained in its own limited and non-shared technology landscape, which has resulted in very low utilization rates and high costs. The power consumption was inordinate and management practice non-standard. Standards were mainly propitiatory, and interoperability was often a challenge.

Security in these DCs was initially poor, but with the advances of the internet, ring-fencing the DC became the norm. Often there was little or no focus on recoverability, and discussions were centered around terms like "mean-time-between-failures" (a typically hardware component term).

As scaling and cost became increasingly uncontrollable, new technologies and methods started to take hold. This produced what is often referred to as the "horizontal DC." Virtualization starts to make inroads on several layers of the technology stack as well as utilizing co-location services for the DC facilities. This results in better management, much higher efficiency rates and a lowering of the cost of processing, and sometimes replacing capex with opex. A dual-DC setup became the norm in many industries with better scalability and adaptability to follow. Standards are increasingly open, and system growth tends to be seen mainly in client/server configurations.

The technology security had to change as well to accommodate the changing and challenging world of the connected data center. Security-in-Depth was born and became the approach of choice.



Current trends

Today, new trends have emerged based on further technological evolution, standardization and interoperability efforts. The digital era is upon us, with very strong effects from social, mobile, analytics, and cloud forces. This era is changing every organization, whether private or public. If this is not already the case, this will certainly be the case in the near future.

To be ready for this disruptive new era, every organization must find a way to deliver innovative new services, which will—or already are—put strains on existing IT organizations and their capabilities. For instance, faster time-to-market requirements demand better provisioning times, integrating social media interactions into the fabric of a front office demands new applications and interfacing, and requirements for better information and insights result in advanced analytics platforms and visualization tools.

As a result, data center services must change as well. Some of the main trends we are currently seeing in the data center space are:

- **Fabric-based computing**—an architecture that brings together loosely coupled compute, storage, and networking components into logical compute resources
- **Opex replacing capex**—removing many capital intense services from the organization's balance sheet and starting to use pay-as-you-go models
- **Cloud computing and private capability clouds**—deliver as-a-service finished business oriented solutions with lower provisioning time and higher standardization
- **Storage efficiency based on the business value of data**—gearing up for managing the explosive growth in data but doing so selectively based on what matters
- **Business focus on security**—elevating risk & security from the IT department to a C-suite concern
- **Sustainable green IT**—environmentally sustainable computing

All these trends have the ability to change how we select, operate, and service our data center services as well as what and how we deliver technology services to the business.

Data center amendments

So what does the next-generation data center look like? And how can we prepare ourselves for the new business requirements, making use of new technology, and incorporating the trends we see?

Many difficult choices will have to be made, but the successful organizations will have the possibility to thrive and be competitive in the new digital insights economy. Looking at the changes currently taking place, structured based on the DC model above, the following amendments warrant our attention.

Facilities

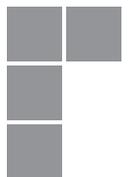
- Increased outsourcing/CoLo—approximately 69 percent of firms in North America and Europe use self-owned facilities, but many expect to move towards other models within a few years
- Green DC/CSR—sourcing green energy for DCs is high on the agenda for most of the large DC providers as well as companies like Google, Facebook, Apple, Microsoft, etc. But you can also make a difference by running your DC services effectively and efficiently

Enterprise resilience & recovery

- Real time systems—using redundant systems, active-active clustering, etc. ensures IT failures have less business impact and keeps service levels high

Servers & Operating Systems

- High density computing—optimization of compute nodes in the DC racks with much higher rates of CPU/area
- Virtualization—technologies used for most equipment to abstract the configuration from the hardware, enabling better utilization and performance ratios
- Containers—technologies to wrap up complete file systems, including code, runtime, tooling, system libraries, etc.
- Vendor Agnostic—ensuring no tie-in to specific vendors to ensure better competition, thus better results
- Open Compute—DC designs shared between larger DC operators describing best practice





Data & storage

- Storage Area Network—snapshots, disk copies, de-duplication, etc. have made a big difference to storage allocation and management practices
- Disk-to-Disk backup—an efficient method to back up, thus eliminating or reducing tape usage and handling
- New protocols—using existing communication infrastructure for storage replication can reduce the DC complexity and cost/Gb

Network & communications infrastructure

- Software-defined networks—an approach to networking in which control is decoupled from the physical infrastructure and allows network administrators to support a network fabric across multi-vendor equipment
- IPv6—replacement of IPv4 with larger addressing space, hierarchical address allocation methods, and security/configuration possibilities

Applications rationalization

- COTS—not a new concept but still relevant in many industries
- BYO-X—usage and support of users' own technology, often in a self-service mode using specific business apps and features
- Mobility and mobile devices—purpose-built applications that can be used on mobile devices wherever and whenever the user needs them

Risk & security

- Risk management—focusing on risks to determine where the technology security budget is best spent; close integration into the enterprise risk framework
- Identification & access management (IAM)—in the (open) enterprise it is necessary to ensure the identity of everyone before entrance on the network (“trust no one”) as well as what each user is allowed to access
- Security-in-Depth—replacing the traditional ring-fencing approach with a layered security model taking into account the enhanced threat landscape

IT operations

- Real time service provisioning—being able to provision systems in minutes, rather than days or weeks
- Cloud services (private/public/community/hybrid)—services provided as SaaS, PaaS, or IaaS from own or provider's DC—sometimes referred to as 'cloudifying' the data center
- X-as-a-service—delivery of services as opposed to technology solutions as well as purchasing external services directly
- DC Infrastructure management tools—determine how much power is used and how it can boost efficiency
- Extended user-base (external parties, etc.)—many organizations now face issues of having a large external user-community where control and data security require new approaches
- Self-service IT—services provisioned to users on a self-service basis

IT management

- Outside-in focus—management approach with focus on external expectations and demands as opposed to pushing services to the business
- Service management—focus on delivering services and on how these are most effective and efficiently produced/sourced
- Performance management—managing results from the IT organization by information and metrics and verifying how well the organization is prepared for future demands



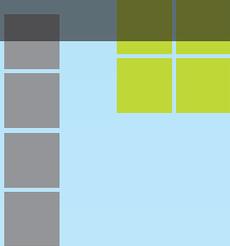


Conclusion

If you imagine these characteristics implemented in the data center you have radically eradicated the silos of the vertical DC, improved upon the horizontal DC, and the business is likely using a mix of services delivered based on a hybrid modular service model. Services will be real time, provisioned in a few minutes, with scalable performance, and from different but approved sources (internal or external). This is the outline of the new data center and service provisioning model and thus the next-generation data center is born.

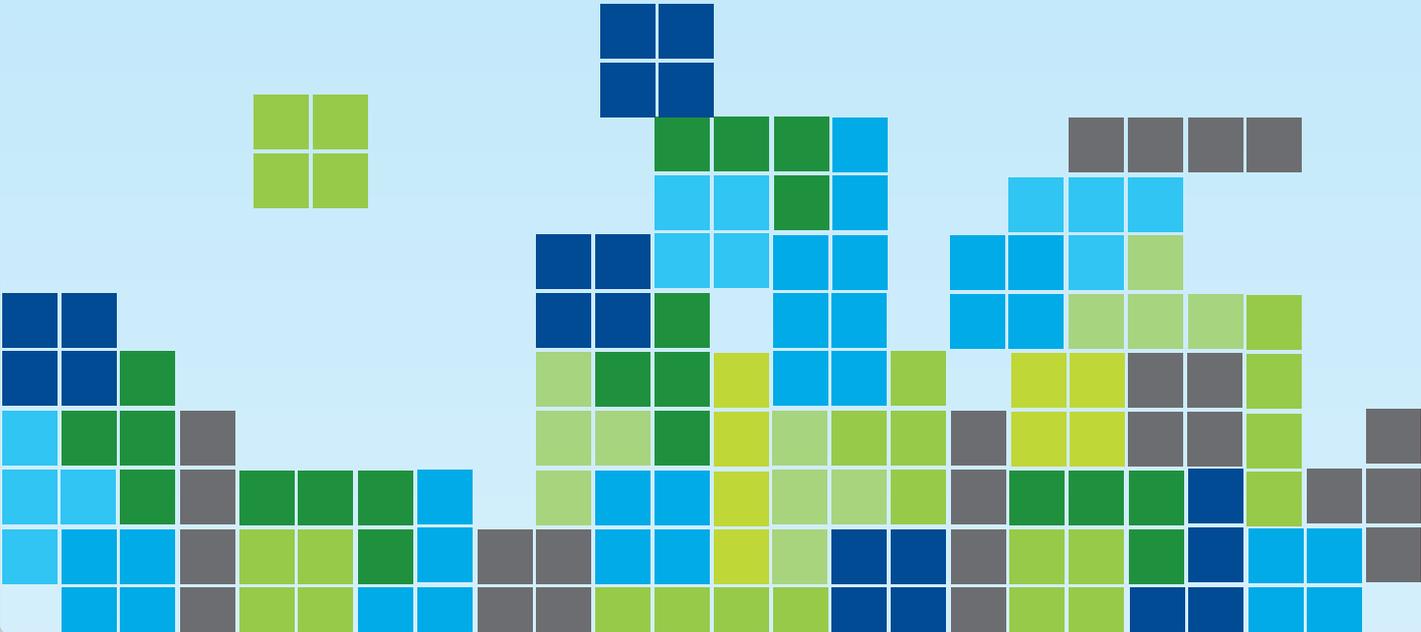
IT can now start focusing resources on the less technical disciplines such as business alignment and quality improvement but critically on innovation. It is at the crossroads of these changes that IT becomes a business partner, the CIO can finally become Chief Innovation Officer, and where the data center becomes a factory and a laboratory for business innovation.

Organizations performing such transformation successfully are taking full advantage of the many technological developments and innovations and will have the possibility to focus on core business and the clients, i.e., the real reason for the services in the first place.



Sources:

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2. Gartner research
3. Forrester research



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