

## **Internet Data Centres - Making Them Work**

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### **Abstract**

*To keep Internet Data Centres working properly, and profitably over time, has been a tremendous challenge. The Internet Data Centre business is highly, and increasingly, complex. Many factors contribute to this complexity. The arrival of new players in the market, on almost a daily basis, forces prices and margins down. New technological advances must be incorporated on a timely basis, but at an unpredictable pace, to meet the constantly changing expectations of demanding customers. To succeed in this market all the components (assets) of an Internet Data Centre, and the dynamics of how they interact (the processes), must be well understood. In order to illustrate what the main assets and processes are and how they contribute to make an Internet Data Centre work, we have chosen to adopt an evolutionary perspective covering all the phases of the Internet Data Centre lifecycle.*

### **The modern Internet Data Centre can**

be thought of as a container, or framework, for a complex and diverse array of infrastructure components and the people that make it work. These include an array of information processing equipment, communications devices, communications and IT software to provide processing intelligence, the facilities to house it, the infrastructure to connect it and to power it and highly trained facilities specialists, communications, IT and administrative people to run it. These are the assets needed to drive the infrastructure demanded by the emerging convergence of the historically distinct voice, video, and data services and associated applications. Fortunately, the design and construction of an Internet Data Centre, while complex, is based upon engineering standards and practices that are well understood and tend to evolve incrementally rather than radically.

The standards and practices which support the operation, maintenance and support of the Internet Data Centre as a facility tend to be consistent with those for existing facility-based technologies. The practical aspects of the operation, design, construction and the physical security of the HVAC (high voltage power supply), electrical distribution, motor/generator sets, and fire detection and suppression and the like are all well understood. Conversely, the standards and practices which support the operation and management of information and communication technology assets contained within the Internet Data Centre, all of a radical evolutionary nature compared to those of the facility itself, often differ significantly from those of the facility-based technologies.

### **Making the Internet Data Centre Work.**

The divergent evolutionary characteristics of the Internet Data Centre facility and the assets contained within the Internet Data Centre raises significant questions. How can standards and practices that will enable the service provider to meet the customer's expectations, while providing service assurance effectively and profitably, be developed and applied? There are three resources that must be present to meet this challenge. In order of importance, they are People, Process, and Technology.

The service provider must be able to recruit the right type of people. Operating an Internet Data Centre requires a fundamental commitment to good professional practices and codes of ethics. These characteristics are essentially intrinsic to an individual's nature rather than learned behaviours.

Individuals must also receive appropriate and regular training on both the technical and procedural aspects of their areas of responsibility and accountability. Staff turnover is a significant, common problem in today's high technology sectors. Accordingly, to reduce the risk factor inherent in the operation of an Internet Data Centre, good personnel management calls for offering sufficient incentives, both to the individual and the team, to enhance job satisfaction and foster commitment. This is the most effective way to reduce staff turnover.

Understanding the processes of a modern Internet Data Centre operation, and effectively specifying these processes in a set of operating procedures, is mandatory. Rigorous, well-defined procedures must govern important life cycle management tasks such as implementation management, network management, systems management, information security management, problem management, change management, configuration management and inventory management. Quality assurance is not optional. The most successful service providers will not only define these life cycle management procedures effectively, but will capture them in software to provide consistency, repeatability and accountability through integration and automation.

While the facilities of the Internet Data Centre itself may have a 20-year lifecycle, the information and communication assets they contain may have, at best, a 5-year lifecycle. In order to maintain competitive advantage, some customers may choose to replace significant percentages of their assets in as little as one year. The service provider is therefore faced with the challenge of acquiring or developing technologies to enable the effective management of a rapidly evolving technical environment.

To maintain profitability, the service provider must take a strategic approach to this challenge by building a standards-based framework of management systems that can be both enhanced and extended while avoiding the historical co-linear increase in staffing costs.

### **Are we Pioneering, or Just Putting the Pieces in Place?**

In the latter half of the 20th century, service providers were successful in pioneering the integration of mainframe computing resources into a Data Centre environment and structuring services that could substitute the in-house operations of their clients. Data Centres offer business application services, as well as highly sophisticated support, to enterprise customers. Typically, a client will find that by outsourcing some, if not all, of his in-house processing his overall costs will be significantly reduced. Today, in the 21st century, service providers must also be able, at minimum, to continue to offer their customers meaningful cost savings. Indeed, to hold off the competition, they must be able to profitably offer improved services at even lower prices.

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The challenge of realising this goal has grown significantly. The technical model has changed - new technologies create wholly new applications and wholly new opportunities - and, as a result, the intricacy of planning, managing, operating and maintaining new systems has increased.

Customers in the 21st century will not be asking for traditional line-of-business application services, those that can be provided by a single mainframe computer located in a single Internet Data Centre. These customers will be asking service providers to deliver, manage, or support converged applications integrating distributed voice, video and data assets that may be contained within multiple Internet Data Centres in multiple time zones in multiple cultural regions around the world. The challenge presented by the architecture, engineering and life cycle management requirements of such applications demands a pioneering effort on the part of the service provider. The new Data Centre offerings will, necessarily, require more than just a simple, linear evolution of existing 20th century systems and services. The integration of multiple, converging, technologies and their associated applications will tax the resources and talents of even the best Data Centre operators for some time to come.

The success of both the 21st century Internet Data Centre and the 21st century service provider will depend upon the development and application of 'New-Generation' Operational Support Systems (OSS) - a historically formidable task. The New-Generation OSS must effectively enable the real-time federation and management of many diverse, distributed information and communication assets and provide a stable platform for the delivery of sophisticated applications, often multi-media, that clients will need to remain competitive in the highly charged e-markets that are emerging. The task falling to the Data Centre operators will be to manage effectively converging technologies and business services so that they can be delivered to the customer reliably and profitably.

The pioneering service provider will take a strategic and innovative approach to this challenge. The OSS's architecture will need to be designed for modularity and extensibility, that is, the new OSS architecture should allow emerging technologies to be either easily added or easily replaced. The new OSS must also facilitate the side-by-side operation of old and new technologies. In this way, it will provide the means to effectively support the migration to new systems as demanded by the evolving technical and business environment.

By building upon a back plane of middleware, an emerging class of enabling software, which can provably scale to millions of transactions per day, global extent will be assured. Data Centre operators, in order to compete and grow, must effectively capture and monitor, from the client's perspective, every aspect of their product's life cycle. They must rapidly incorporate technological advances and be ready, not just to react to customer demand, but to innovate. When the clients' expectations are met, or better - exceeded, they will continue to request additional products and services. What the customer ultimately seeks, is the pioneer who will turn their reduced cost centre into their new revenue centre.

If customers are to rely on Internet Data Centre providers for their mission-critical Internet operations, they expect not only cost reduction and a highly reliable physical environment, but also a partner that can help them concentrate on their core competencies. They need a partner to deal with the overwhelming logistics of emerging technologies, as they are plunged into the 21st century, so they can concentrate on their business.

## **Conclusion**

Accordingly, the Internet Data Centre provider must realise that, if he is to survive, all the complex yet disparate components of his operation must work together efficiently - at the moment, on demand,

without effort and without failure. In contrast to what has been, typically, an environment where pasting parts together has been the rule, establishing and operating an Internet Data Centre requires a high degree of planning and skilful implementation. It is through planning and professional implementation that physical integrity of the operation is ensured, that Operational Support Systems with a flexible architecture can be developed and implemented, that best-of-breed components for management, provisioning and customer care be provided and preparation for the future guaranteed.