



**IBM BladeCenter —  
Network Directory Server (NDS)  
Solution featuring:**

- Apertio
- SUSE
- Intel

*Alex Cabanes  
IBM Systems & Technology Group  
Industry Marketing Manager, Next Generation Networks*

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### Overview

The imperative for telecommunications service providers is to position the subscriber at the center of their operations, so a complete and consistent view of customer information can be shared across any application. The many database silos of yesterday's networks need to be transformed into a single, highly scalable, high performance Network Directory that can be accessed by any network or business application that needs to process subscriber data. As service providers prepare for IMS (IP Multimedia Subsystem), UMA (Unlicensed Mobile Access) and other IP services they are finding that generic relational database technologies are proving difficult to implement because they have not been developed for the unique requirements of the communications industry. Apertio has developed this critical NGN database platform and accelerated its time-to-market by leveraging the strengths of the IBM BladeCenter, including:

- *IBM BladeCenter H platform supports the carrier-grade SUSE Linux platform*
- *With a single, Dual-Core Intel® Xeon® processor, the Apertio NDS was shown to deliver a 1ms write time at 6,000 TPS on a single Front End server with less than 50% CPU usage.*

### Apertio Network Directory Server (NDS) solution

In contrast to the traditional database approach, the One-NDS (Network Directory Server) is a high performance X.500-based directory, specifically designed and built for the demanding needs of the telecommunications industry. One-NDS has been optimized and ideally suited for demanding environments that require performance, resilience and scalability with a small physical footprint. One-NDS offers efficiencies that result in higher performance and potentially lower total cost of ownership (TCO). Through repeated competitive trials its data access time has outperformed disk-based system and competing technologies. The One-NDS system can scale from 1,000 to over 250 million subscribers, while maintaining unparalleled 1 to 3 millisecond response times across a distributed environment.

One-NDS is a software solution that provides resilience through its distributed and replicated architecture and thus can provide services availability approaching 100% without the necessity for expensive proprietary, fault-tolerant hardware. The One-NDS database is supported on Linux, enabling customers to benefit from the greatly reduced total cost-of-ownership and increased price-performance characteristics of the IBM BladeCenter system.

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**Highlights**

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*IBM BladeCenter family provides a scalable open standards based platform for next generation networks applications*

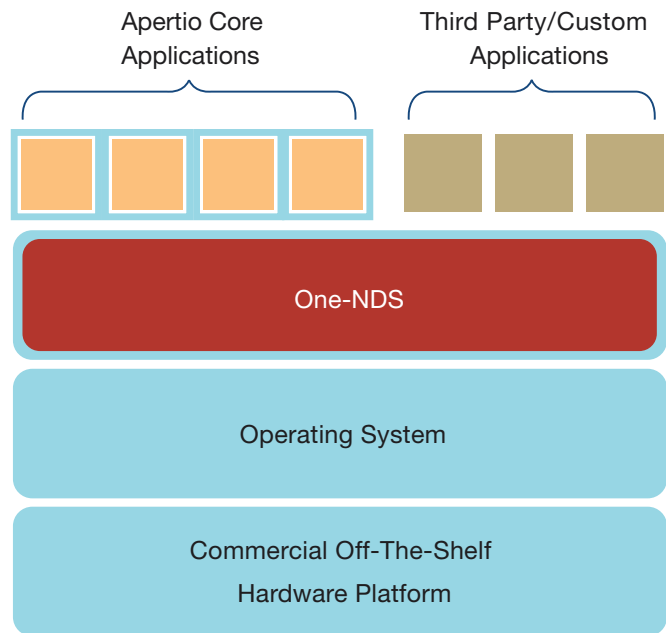
One-NDS enables application servers to access subscriber and service data on demand. All applications share a common directory providing one time provisioning. The Apertio One-NDS software architecture provides a single logical directory entity that can be implemented across 1 to 256 physical locations. Every physical entity has access to every data record, providing excellent reliability and performance. To provide advanced integration with the telecom service providers' applications, One-NDS supports a variety of open interfaces, including LDAP, DAP, SQL and ODBC/JDBC.

These open interfaces enable the data to be linked to business support applications, such as CRM systems, giving telecom service providers the ability to fully leverage their knowledge about customers to gain deeper insight, both to achieve competitive advantage and proactively reduce customer churn.

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**Apertio One-NDS architecture**

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Source: Apertio

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**Highlights**

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*As services converge, the underlying infrastructure is also converging onto a common COTS based platform*

**The IBM BladeCenter family**

The IBM BladeCenter T chassis supports full hardware redundancy (power supply, I/O modules, management modules, L2 switching, mid-plane, etc.) thereby minimizing potential points of failure in the solution.

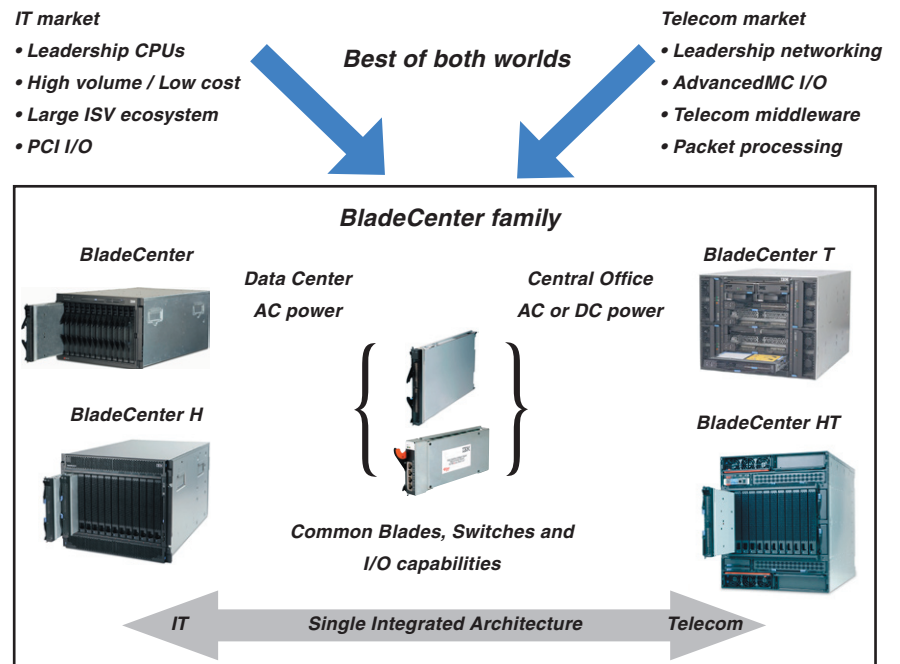
The IBM BladeCenter is an advanced blade system which integrates servers, storage and networking into a single chassis – yielding significant simplification, improved density and potential TCO savings . A single family of common server blades, storage, I/O, switches and networking modules are fully supported and interchangeable across the entire family of BladeCenter chassis. The IBM BladeCenter chassis is designed as the ideal solution for data center deployments. The IBM BladeCenter H is for high performance computing platform, while the IBM BladeCenter T chassis is specifically designed for telecom central office deployments.

The new, IBM BladeCenter HT – a new, telecom optimized version of the BladeCenter H – opens new market opportunities with a new and powerful NGN platform ideally suited for telecom equipment and service providers.

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**Advantages of the IBM BladeCenter**

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Source: IBM

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**Highlights**

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*IBM systems, software, services and partners delivers a comprehensive portfolio that helps accelerate the NGN transformation*

The IBM BladeCenter T and BladeCenter HT deliver rich telecommunications features and functionality, including fault-tolerant capabilities, hot-swappable redundant DC or AC power supplies and cooling, and built-in systems management resources in a 20” deep chassis. The IBM BladeCenter T and BladeCenter HT have been designed and developed to meet the rigorous Network Equipment Building System (NEBS) Level 3 and European Telecommunications Standard Institute (ETSI) standards for electromagnetic compatibility, thermal robustness, fire resistance, earthquake and office vibration resistance, transportation and handling durability, acoustics and illumination, and airborne contaminant resistance. The IBM BladeCenter T and BladeCenter HT have been specifically developed to meet the robust reliability, power, form factor and extreme environmental needs for telecom central office deployments.

**Harnessing the power of the Intel Xeon processors**

The Quad-Core Intel® Xeon® processor series surpasses most other processors by providing excellent computational density and value.

*The BladeCenter family offers choice of processors, connectivity, power and form factors to simplify the deployment of solutions in the telecom central office or data center*

The new Intel® Core™ Microarchitecture further improves performance by increasing the size of the L2 smart cache, increasing the instructions per cycle by 33% and doubling the width of the SSE3 engine for media-intensive calculations. Lastly, the associated Intel® 5000P Chipset supports 21 GB/s of memory bandwidth to Fully-Buffered DIMMs (FB-DIMMs) and 21 GB/s of peak system bus bandwidth through its Dual-Independent Buses (DIBs). The combination of 4-cores per socket, the new Intel® Core™ Microarchitecture, and the high-throughput chipset supporting FB-DIMMs allows the BladeCenter HS21 to bring unrivaled performance to the blade market segment.

Highlights

The use of interchangeable blades across the entire BladeCenter family, allowing service providers to deploy both network and IT functions on this common platform

“The Apertio One-NDS in-memory database has been purpose built to meet the real-time requirements of new generation of IP infrastructure. By creating a unified view of customer data in real-time, service providers will be able to build subscriber intelligence into their services while dramatically reducing CAPEX and OPEX costs. These benchmark tests demonstrate the scales of economy of Intel Xeon processors on high density IBM HS21 Blade servers give service providers the TCO competitive edge.”

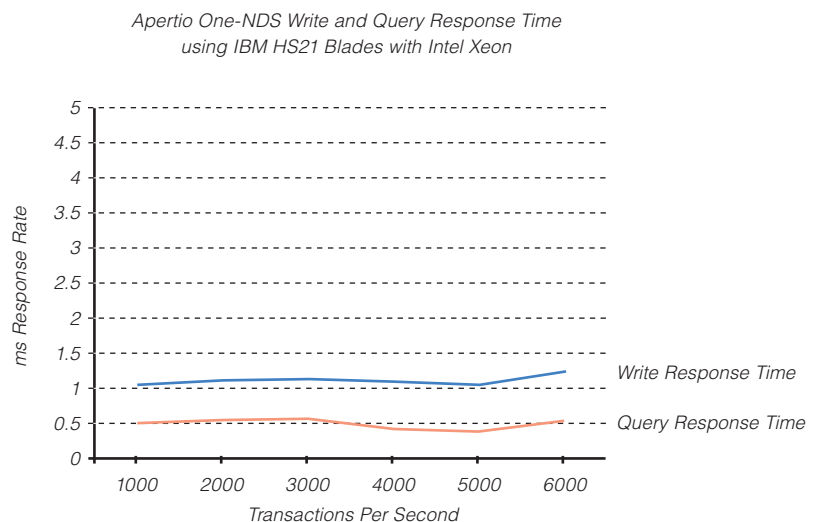
— Wallace Ascham, Vice President Partners and co-founder of Apertio

Scalability

To provide telecommunications environment grade performance, the One-NDS database utilizes in-memory data storage and is optimised for very high transactional throughput and extremely low latency. Transaction and data scalability is achieved via independent and unlimited scaling of front end and back end server configuration. One-NDS implements a load-sharing (N+k) redundancy policy, where “k” is the number of redundant nodes desired by the operator. Software resilience is provided in the X.500 standards based architecture that provides real-time replication of data to ensure data is not lost. The One-NDS also supports automated platform backup and recovery and resynchronisation routines that make the system largely self-managing.

Recent scalability testing at the IBM Network Transformation Center in Montpellier, France demonstrated the impressive transactional performance of the Apertio One-NDS, delivering an average update time of 1ms and read time of 0.5ms on very economical entry level servers where RDBMS database technologies are clearly failing to deliver on their promises. This performance together with carrier grade resilience and scalability make One-NDS the preferred choice for communications service providers.

Benchmarked Network Directory Services (NDS)



Source: Apertio

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**Highlights**

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*Integrated platforms reduces complexity while improving reliability*

*The IBM BladeCenter family offers telecom service providers with increased flexibility in how they choose to deploy applications in the central office or the data center*

**Unprecedented performance, flexibility and reliability**

Today's telecom infrastructure and data center environments require greater processing capacity, lower power consumption and ease of use to deploy new services being deployed every year. The integrated COTS solution of IBM, Intel and Apertio addresses these issues with interoperability, flexibility, ease of use and cost effectiveness. The reliability of the IBM BladeCenter and the ability to use the Dual-Core Intel® Xeon® processor is greatly enhanced with SUSE Linux carrier-grade capabilities. The solution provides:

- *Greater throughput and energy efficiency using the Intel Xeon processors with low power consumption*
- *Carrier-grade, Network Directory Server (NDS) from Apertio*
- *Reliable and highly available IBM BladeCenter platform*
- *Highly scalable, open standards, Linux based X.500 solution*
- *Ease of Use for fast deployment, maintenance and the adding subscribers*
- *Greater cost effectiveness*

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IBM BladeCenter QS20 requires a separate chassis from other blade servers, and is supported only in the original BladeCenter chassis. Some machines are designed with a power management capability to provide customers with the maximum uptime possible for their systems. In extended thermal conditions, rather than shutdown completely, or fail, these machines automatically reduces the frequency of the processor to maintain acceptable thermal levels.

MB, GB, and TB = 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, when referring to storage capacity. Accessible capacity is less; up to 3GB is used in service partition. Actual storage capacity will vary based upon many factors and may be less than stated. Some numbers given for storage capacities give capacity in native mode followed by capacity using data compression technology. Maximum internal hard disk and memory capacities may require the replacement of any standard hard drives and/or memory and the population of all hard disk bays and memory slots with the largest currently supported drives available.

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