

Groupe Bull Mans the High Performance Point While Leading Migration Charge to Itanium

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Management Summary

Choices. You face them every day. Some are mundane and simple. Some are more complex and more expensive. Every day, however, you face them. When you go to the supermarket, for example, you face an entire aisle of choice for a single product – bread, for example. A staple, we buy it every week because fortunately, it does not cost a lot of ... “bread” to buy it. In most cases, you do not even think about it. You simply go to the same location each week and pick up a loaf of your regular, say *Wonder Italian Bread*. You are very loyal. You know what to expect. You feel that you can count on Interstate Brands, Wonder Bread’s owner, to produce a reliable product. What do you do, however, if when you reach for that spot on the shelf and *your* bread is not there? Maybe the delivery truck is stuck in traffic, maybe the ovens broke down last night. It is relatively simple to reach down and select another brand, after all what is more of a commodity product than bread? If you knew beforehand that your brand would not be there then you could prepare yourself. You could check the store ad for prices, ask a neighbor about his favorite, etc. However, one loaf of bread may not warrant such preparation.

What about your automobile? This is a much more significant investment. Here again, there is a significant amount of brand loyalty. If you purchased a Ford, and it proves to be economical, reliable, and safe then you will probably be inclined to go back to Ford for your next purchase. This could be for a “second” car or simply a replacement to get a new one. (Let us pretend for the moment that we are back in the 1960s.) What happens, however, when the last car you purchased was the Ford *Edsel*? You loved that car, but it is no longer available. You will have to look at something else. However, it was a Ford. Should you look at another model of Ford? After all, you can certainly see the USA in a Chevrolet! This is another choice that you must weigh and decide.

Now, what happens when the choice you make is for a mission-critical computer server? The vendor that you have used for years may have announced plans to discontinue “your” enterprise server. They will support your existing platform for several more years. They will even provide you with a migration plan. What do you do? Groupe Bull finds itself in that very vendor position today. For 50 years, Groupe Bull has been a leader in the development and manufacture of computer systems for a wide range of customers covering Government, Finance, Manufacturing, and beyond. Over the past 30 years, Bull’s popular proprietary systems ranged in size from the *GCOS6* mini-computers, to the *GCOS7* mid-range systems, to the *GCOS8* mainframes. IT Directors currently using legacy servers from Groupe Bull are faced with major decisions regarding their future choices of application processing platforms. To learn more about the choices provided by Groupe Bull, read on.

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Corporate History

Fifty years ago, Honeywell and Raytheon Corp. joined forces to create a new company to provide a single new product into an unknown market space. They named the company Datamatic Corporation. The new product introduced was a computer called the D-1000. It weighed 25 tons, occupied 6,000 square feet, and cost \$1.5 million in 1955, when a dollar was worth ... a Dollar! This marked the entrance of Honeywell into the computer market.

The next 50 years saw the introduction of many new generations of computer systems: *GCOS6*, *GCOS7*, and *GCOS8*, each more powerful than the previous, more unique than the previous. It also saw the formation of a variety of partnerships between NEC in Japan, Honeywell in the U.S., and Groupe Bull in Europe to introduce these products on a worldwide basis. This partnership resulted in Groupe Bull becoming a worldwide computer company in the early 1990's.

Over a decade ago, Bull recognized the difficulty of maintaining development and manufacturing energy in all of these areas. They made a decision to migrate their *GCOS6* proprietary customers to an open systems platform, using architecture developed in-house to create a binary compatible environment, *HVX*. The initial server selected was the *DPX/20*, an *AIX* platform based on shared technology co-developed with IBM. This platform evolved into the *Escala Open Systems Server*. With this technology, Bull successfully retained the majority of their *GCOS6* customer base, giving them more performance at lower cost, while retaining the investment these customers had made in applications, data, and training.

Now, Bull is introducing the *NovaScale* family of commodity¹ servers, based upon the Intel *Itanium 2* microprocessor. In addition to serving as the basis for a new high-performance computing initiative, *NovaScale*

¹ *Commodity* is a term with many common uses. In this case, the reference is to widely-used processors (used by many systems vendors) resulting in large-scale manufacturing, which tends to lower the price of the processors, approaching commodity pricing levels. It does not imply that there are multiple, competing sources from which to acquire the component.

will also serve as the migration destination for applications currently running in the *GCOS7* and *GCOS8* environments, while Bull continues to support these proprietary mainframes.

A Legacy of Platforms

Bull has developed a variety of legacy servers over the past five decades, some proprietary and some commodity. These servers have come about through acquisition and through partnership. Bull's current legacy product set consists of four families, which can all run some combination of *Windows*, *UNIX*, and/or *Linux* operating system(s) directly or through a coprocessor:

- *GCOS8* Mainframe (Proprietary)
- *GCOS7* Mid-Range (Proprietary)
- *Escala* – 64-bit *AIX* Server
- *Express5800* – IA-32 Servers

The infrastructure to design, manufacture, distribute, and support all of these disparate products is a broad and expensive undertaking. Indeed, you may say the same for *managing* any combination of these in a single data center. This is clearly a difficult situation: having too many platforms to carry through further development, not to mention the loss of manufacturing economies of scale. **So, Bull announced the decision to evolve their proprietary customers to a more open architecture with the introduction of the NovaScale Itanium 2 Server Family of 64-bit servers.**

The NovaScale Family

Using a 64-bit processor, with the surrounding architectural enhancements, enables the development of a server with faster response time, access, throughput and calculation capacity, along with a capability for more queries from more concurrent users.

Bull's *NovaScale* servers were developed in partnership with:

- **Intel** - through early access to *Itanium* specifications and *NovaScale* chipset reviews by Intel (See *NovaScale Difference*, on the next page); and
- **Microsoft** – through early access to both *Windows 2000 Datacenter* and *Windows*

Server 2003 source code and a common review of the NovaScale architecture.

Unlike many of their competitors, Bull does not manufacture any of the server surround platforms such as disk arrays and tape libraries. As with their Escala AIX Servers, they have implemented a best-of-breed strategy, integrating state-of-the-art products from partners into the NovaScale architecture. For example, Bull integrates and qualifies RAID arrays from EMC and tape libraries from STK, so that it can concentrate its efforts on the server architecture.

High Performance Computing

Taking advantage of the high performance capability of the *Itanium 2* (also called *Madison*) microprocessor from Intel, NovaScale provides low-cost, scalable performance, which matches, or exceeds, that of any other open systems server currently available. With its 64-bit addressing capability, NovaScale delivers the power required by scientific applications manipulating large data sets.

Using the latest SPEC listings provided by The Standard Performance Evaluation Corporation, the NovaScale Family provides the highest ratings (as of Aug 6, 2003) for the SPEC CFP 2000 benchmark², as follows³:

- *NovaScale 4040* (4-way) - 64
- *NovaScale 5080* (8-way) - 125
- *NovaScale 5160* (16-way) - 215

SPEC_{fp}_rate2000 is the metric of choice to compare the performance of multi-CPU servers in a compute intensive environment, where floating-point computations constitute a major portion of the executable code. It measures the throughput, or rate, of a machine carrying out a number of tasks in a multi-user environment.

The values above exceed those of any 8 or 16 processor high-performance Server from companies such as IBM (*Power4*), Hewlett-Packard, or Sun (*UltraSparc III*) that already

² SPEC® and the benchmark name SPEC_CFP2000® are registered trademarks of the Standard Performance Evaluation Corporation.

³ See <http://www.spec.org/cpu2000/results/rfp2000.html> for the latest results.

has been tested and published. In addition, NovaScale provides a complete set of solutions to meet the demands of high-performance computing applications for the scientific and technical communities.

With the Linux Operating System available, NovaScale is also in position for use in high-security government and commercial enterprises, with its recent approval by The Common Criteria organization, an international standards organization, for mission-critical computers.

Commercial environments such as these are frequently more transactional than computational in nature. In order to evaluate the performance of NovaScale for commercial applications, Bull will be submitting results to the Transaction Processing Council for their TPC-H Benchmark. This test measures performance in a datawarehousing environment. Based upon the current listings available, Bull expects to exceed the performance levels currently available.

Why Itanium?

The Itanium 2 processor is the second in a family of 64-bit commodity CPUs that does more than just bring the high performance and volume efficiencies of the Intel architecture to high-performance and mission-critical enterprise applications. Based upon the *Explicitly Parallel Instruction Computing (EPIC)*, Itanium 2 improves upon the scalability of Bull's IA-32 *Express5800*, especially above the 8-CPU configuration, enabling Windows applications to penetrate deeper into the data center. It is also binary compatible with the IA-32 instruction set and brings forward the following features introduced with the first generation Itanium processor:

- **Advanced error detection, correction and containment** provided by Machine Check Architecture (MCA),
- **Comprehensive error logging**, and
- **Error Correcting Code (ECC)** on cache and the system bus.

These features enable enterprises to maximize their investments by delivering industry-

Groupe Bull's Itanium 2 Servers

Bull's NovaScale Family

- *NovaScale 4040* - 1-4 way server
- *NovaScale 5080* - 4 and 8 CPU platform
- *NovaScale 5160* - 4, 8, 12, and 16 CPU platform

leading, performance at lower cost with a commodity chip rather than with a proprietary architecture. Itanium 2 is expected to increase performance by 50 to 100% on platforms using this chip set at speeds up to 1.5GHz, as compared to the initial Itanium 1 implementations at 733/800 MHz.

The NovaScale Difference

As a commodity server, NovaScale consists of standard building blocks such as the Itanium 2 microprocessor and the Windows Server or Linux Operating System. In order to improve the performance of NovaScale, Bull implemented the *FAME Scalability Switch (FSS)*. FAME (Flexible Architecture for Multiple Environments), developed in close conjunction with Intel, is an architecture designed to meet the scalability performance and robustness needs of both the technical and commercial arenas. The main elements of the FAME architecture are:

- The FSS interconnect processor - designed by Bull to support the multiple 4-way processor boards that constitute the core of the server design with maximum throughput and fault tolerance; and
- The I/O Subsystem – designed to optimize access to data and to the network with 6 GB/s of peak bandwidth, 2 GB/s of sustained throughput, and the capability to execute 250K to 300K I/O operations/s.

This additional benefit meets its design goal to provide best in class scalability for symmetrical multiprocessing (SMP) environments.

NovaScale is the only Itanium solution that enables the enterprise to run Microsoft Windows, Linux and GCOS simultaneously

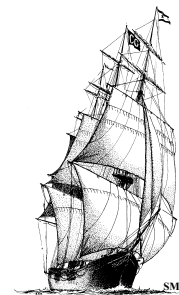
on a single server. This is an especially important characteristic for any Bull customer looking to protect the investment made in applications, data, and training for either of the Bull proprietary environments in use at their site.

Mainframe Evolution

Bull has provided to its GCOS7 and GCOS8 customers a definitive roadmap with a clear evolution path to the performance capabilities of the Itanium 2 microprocessor. Combined with the value-add of the FAME architecture, NovaScale provides binary compatibility for the GCOS applications – no changes, no recompilation. This also ensures binary compatibility for applications running on the IA-32 coprocessors provided to GCOS 7 customers in 2001 with the *DPS7000 XTA (Diane)* servers and to GCOS 8 customers with Bull's IA-64 (*Helios*) servers.

Conclusion

Groupe Bull has dedicated significant resources to develop an affordable commodity platform that will deliver high-performance capabilities to all customers across the board. More significantly, they have done this while taking pains to protect the investment that their existing base has made in Bull's proprietary applications. In a world where we are used to hearing promises made seemingly with no intention of being kept, it will be interesting to see how successful Bull is with the GCOS 7 and GCOS 8 migrations, especially since GCOS 6 moved successfully from a proprietary base to an open systems platform. Only time will tell if Bull can repeat that success, but NovaScale could be a winner.



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