Executive Summary

“The Dell Quickstart Data Warehouse Appliance saves us 50–60% in both time and money compared with building our own systems. ... Performance is excellent, and we realize greater efficiencies throughout the life of the system.”

—Senior solutions engineer for a leading software as a service (SaaS) provider to the telecommunications industry (from an interview conducted on 20 December, 2012)

Large companies have been using data analytics for years to gain competitive advantage through better, faster, evidence-based decision making. Dashboards and reports based on accurate, up-to-date, and comprehensive information give these companies deeper insight into their customers, operations, and competitive landscape to help them increase profitability, mitigate risks, and optimize efficiency.
Until recently, the business advantages of data analytics were beyond the reach of most small and medium sized businesses due to the high costs and long timelines associated with designing, deploying, and managing a data warehouse. The Dell™ Quickstart Data Warehouse Appliance provides an answer to this challenge. This complete data warehouse solution combines technologies and services from Intel, Microsoft, and Dell to provide a cost-effective, production-ready appliance that can be deployed in just hours.

Based on the Microsoft® SQL Server® 2012 Fast Track Data Warehouse reference architecture, this highly optimized appliance provides a high-performing solution for integrating and analyzing all relevant business data. The efficient multi-core architecture of the Intel® Xeon® processor E5 family helps to ensure that the appliance provides fast response times for multiple, complex queries running simultaneously across up to 12 terabytes of user data. The appliance can be integrated with Microsoft business intelligence (BI) tools to enable decision-makers across the business to quickly access, analyze, and share information using familiar applications, such as Microsoft® Excel®. Dell Boomi® adds to these advantages with a cloud-based service that greatly simplifies the otherwise complex task of integrating and loading data from diverse internal and external sources, including cloud-based data and core business applications, such as Microsoft Dynamics®.

The ability to analyze data and share insight across the business is essential for success in competitive markets. This white paper explores the benefits and challenges of implementing a data warehouse to lay the foundation for efficient, high-quality data analytics. It explains how the Dell Quickstart Data Warehouse Appliance helps businesses deploy effective capabilities quickly, and with reduced cost and risk, to begin transforming their company into a data-driven organization that can compete more effectively.

The Proven Value of Data Warehousing for Business Intelligence

Businesses of all sizes are using data warehouses and business intelligence tools to drive business success. They are combining real-time and historical data and analyzing it to help executives and front-line employees make better, faster decisions based on a more accurate understanding of what happened, what’s happening, and what’s likely to happen.

According to a study conducted by the Massachusetts Institute of Technology (MIT) Sloan School of Management, top performing organizations are twice as likely as lower performers to use analytics to guide their day-to-day operations and future strategies (Figure 1).
The Aberdeen Group reports similar findings, noting that: “...Best-in-Class companies are employing both strategic and tactical dashboard solutions in order to drive double digit improvements in profitability and have achieved substantial increases in customer service and sales performance.”

Today’s leading data warehouses and BI applications support dashboards and much more. Users have access to role-based tools for analyzing, presenting, and sharing information. They can perform ad hoc queries, data mining, and predictive analytics, create visually striking reports and share them throughout the business, and do all this with familiar tools, such as Microsoft Excel and Microsoft® SharePoint®. By using analytics and other BI solutions:

- **Executives** can monitor operations, finances, and market conditions more accurately and track the business more effectively against metrics and objectives.

- **Marketing teams** can design, monitor, and refine campaigns more quickly and accurately based on deeper insight into customer demographics and purchasing behavior.

- **Sales representatives** can identify and assess prospects more effectively, shape deals based on inventory and profitability levels, and quickly determine who’s buying what and why.

- **Design and manufacturing teams** can assess customer needs more effectively across segments, geographies, and use cases to deliver better products in a more timely and efficient manner.

### Data-Driven Companies Perform Better

<table>
<thead>
<tr>
<th></th>
<th>Top Performers</th>
<th>Lower Performers</th>
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<td>Use analytics to guide</td>
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</tr>
<tr>
<td>Use analytics to guide</td>
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<td>27%</td>
</tr>
<tr>
<td>day-to-day operations</td>
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</table>

*Source: MIT Sloan study; results published in MIT Sloan Management Review.*

In a 2010 study, MIT Sloan researchers found that top performing organizations were twice as likely to use analytics to guide their day-to-day operations and future strategies.

### Why You Need a Data Warehouse

Most businesses already have the data they need to drive better decision making. However, that data is typically distributed across multiple applications, databases, and spreadsheets. Some of it is located in servers within the data center, some of it on PCs and laptops scattered throughout the business, and some of it might be in applications or databases hosted by a software-as-a-service (SaaS) vendor or a third-party cloud provider.

Turning that distributed data into actionable insight can be a daunting process. Data has to be located, accessed, retrieved, checked for accuracy and usability, and combined; and this process must be repeated for every new analysis.

When a data warehouse is properly implemented, it provides an accurate, business-wide data set that is always available for both planned and ad hoc analysis. A high quality data warehouse is also optimized for fast analytics and reporting with no impact on operational applications. Dozens of queries can be performed simultaneously, including cross-functional analysis, to improve decision-making across the business.

### The Challenges of a Build-Your-Own Data Warehouse

#### Startup Challenges

Designing, deploying, optimizing, and testing a data warehouse can be a costly and time-consuming process. Most IT organizations have developed best practices for building and managing databases for online transaction processing (OLTP), but the analytics workloads processed by a data warehouse are very different.

OLTP depends on low-latency retrieval of small amounts of data from random locations in large data sets. The database must locate and access a few rows of data very quickly to complete an individual transaction. Performance is typically measured in operations per second (IOPS). By contrast, analytics depends on the fast retrieval of much larger data sets and requires high-speed scanning of sequential data. Performance is primarily determined by serial I/O scan rates and is typically measured in megabytes per second (MB/s).

Because of these workload differences, a data warehouse requires different components, different hardware and software configurations, a different database design, and different operational and management practices. In-house design teams often try to improve the performance of a warehouse by using large numbers of storage disks to increase I/O scan rates through parallel access. It is not uncommon to see hundreds of disks used, even in a small warehouse.

Another common strategy for increasing analytics performance is to employ traditional database optimization techniques, such as building indexes, pre-aggregating data, and limiting access to lower levels of data. However, the performance benefits tend to be limited. Appropriate data structures might increase performance for some analyses, but often lead to fragmented data sets that slow performance for others. Maintaining these structures also adds to management overhead and introduces delays in the flow of information, since data structures typically have to be re-optimized each time new data is loaded into the warehouse.
Operational Overhead
Managing a data warehouse to ensure high data quality and fast query performance also tends to be a resource-intensive process. Traditional approaches to extracting, cleansing, loading, integrating, and reconciling data are complex and time-consuming. They can add considerably to the total cost of the analytics environment. They can also introduce delays as business decision-makers wait for new operational data to be loaded and structures to be optimized for analytics. Such delays can prevent the data warehouse from being used successfully in many real-time business scenarios, such as customer engagements.

Fast, Low-Risk Data Warehouse Deployment
"Database appliances can simplify the DBMS architecture, shorten implementation times and reduce the cost of DBMS implementations. More importantly, they can reduce the risk that a database will perform poorly because of inadequate configuration."
—Gartner, September 14, 2012

Data warehouse appliances offer a solution to the high costs and long deployment timelines of traditional data warehouse implementations. These pre-designed and pre-configured systems include all the necessary hardware and software and are built to deliver predictable performance and high reliability under specified loads. They typically come with integrated support, as well, with a single point of contact that helps to simplify implementation and problem resolution.

Because of these advantages, data warehouse appliances are already making major inroads in the marketplace. In a recent online survey conducted by SearchDataManagement.com, "42% of the 340 respondents with data warehouses in place or planned within the next 12 months said they were using or planning to deploy data warehouse appliances."

The Dell Quickstart Data Warehouse Appliance provides a complete, highly optimized data warehouse platform that can be deployed within hours (Figure 2). Based on the Microsoft SQL Server 2012 Fast Track Data Warehouse reference architecture and configured with the latest Intel Xeon processors, this appliance delivers excellent performance with a small data center footprint. It is designed to provide best-of-breed capabilities with the lowest possible system cost and the lowest possible cost per terabyte.

The Dell Quickstart Data Warehouse Appliance helps businesses overcome both operational challenges and startup challenges. It comes with Dell Boomi, a cloud-based data and application integration solution that eliminates much of the complexity and management overhead of traditional data integration tools. Dell also provides complete service and support at no extra cost, including hands-on training using each customer’s own data sources and use cases, and quarterly health checks to help maintain optimized performance as data and workloads grow.

The Dell Quickstart Data Warehouse Appliance is pre-built, pre-configured, and validated against the Microsoft Fast Track data warehouse workload. The complexities of building a best-in-class data warehouse are handled by experts from Microsoft and Dell based on long experience with real-world implementations. Because the cost of the initial design is defrayed across a large number of customer implementations, the appliance offers economies of scale that could never be realized by a single customer building a system from the ground up.

With this approach, IT organizations can potentially save dozens or even hundreds of hours of staff time. They don't have to select, size, and order systems and components. They don't have to research options, resolve interoperability issues between components, or test and tune the warehouse to ensure optimized performance. The entire deployment timeline is shrunk from weeks or months to just a few hours. Even companies with long experience in data warehousing can benefit from this approach (see the sidebar, The Dell QuickStart Data Warehouse in Action).

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**Figure 2.** The Dell™ Quickstart Data Warehouse Appliance includes all hardware, software, and services in a pre-configured solution that helps to ensure high performance, high reliability, and fast, low-risk implementation.
An Optimized, Production-Ready Solution

Each Dell Quickstart Data Warehouse Appliance comes with complete software and hardware, including:

- Microsoft SQL Server 2012 Data Warehouse Appliance Edition
- Windows Server® 2008 R2 operating system
- Dell Boomi application and data integration software (provided as a cloud-based service)
- A Dell™ PowerEdge™ 12th generation server based on the Intel Xeon processor E5 family and configured with all required storage
- A Dell PowerEdge RAID Controller

Unlike many database appliances in the market today, Dell Quickstart Data Warehouse Appliances are built and optimized specifically for analytics rather than for general-purpose workloads. All hardware and software components are selected and tuned to optimize performance and throughput for data loads and queries. Dell and Microsoft engineers balance the execution capability of the multi-core Intel Xeon processor against the I/O throughput of the storage disks and RAID controller. Individual components are tested and selected using synthetic benchmarks to ensure they can handle full loads without creating performance bottlenecks. The system as a whole is then tested using analytic workloads to ensure system-level performance in real-world environments.

This design approach helps to ensure high performance under heavy workloads up to the maximum rated data capacity—without over-provisioning the appliance, which would drive up costs, or under-provisioning, which could lead to user dissatisfaction or additional, unplanned expenditures. To help reduce risk, only proven components from Intel, Dell, and Microsoft are used.

Installed and Ready for Your Data within Hours

An automated deployment script makes it easy to install the appliance in your data center. No additional tuning is required. You can begin creating your database and loading your data as soon as the startup script has completed, and you can grow your data set to the system’s full rated capacity with confidence. Consulting time with a Dell Data Warehouse Solution Architect is included with the appliance to help you implement your first reports, queries, or dashboards more quickly and effectively.

THE DELL™ QUICKSTART DATA WAREHOUSE APPLIANCE IN ACTION

The telecommunications industry is hyper-competitive. Subscribers are demanding, requirements are always changing, and profit margins are tight. A leading SaaS provider is helping telecommunication providers around the world improve their margins by capturing, storing, and analyzing their carrier-to-carrier billing data to identify errors that could otherwise lead to many millions of dollars in lost revenue.

This company has deployed dozens of data warehouses for its customers over the past decade, and is now moving toward standardizing on data warehouse appliances based on Microsoft® SQL Server® and servers powered by Intel® Xeon® processors. According to the company’s senior solutions engineer, “It’s almost impossible for an in-house expert to keep up to date with technology advances and design best practices across all components of the solution stack. We can hire consultants, but they often have limited expertise, and ongoing support can be costly. With a Dell appliance based on Microsoft and Intel components, we know we’re getting a best-of-breed data warehouse solution with superior cost models—and service and support from Dell has been first rate. They’ve shown a real commitment to our ongoing success.”

The Dell Quickstart Data Warehouse Appliance is ideal for the company’s mid-tier customers. “The Dell Quickstart Data Warehouse Appliance saves us 50–60% in both time and money compared with building our own systems. I don’t have to open and manage a major project to deploy a new data warehouse. Performance is excellent, and we realize greater efficiencies throughout the life of the system.”

Despite the company’s considerable expertise in data warehousing, they realize additional benefits from the tools and services that are included as part of the overall package. “Dell Boomi® is a great tool for us. We don’t have to use multiple ETL products and we don’t have to write complex connectors to accommodate all the various data sources and types. Dell’s quarterly health checks are also valuable. Diagnostics and performance optimizations are performed by a Dell expert, so I have the confidence of knowing the warehouse is operating efficiently, without the complexity of scheduling and performing internal audits.”

With these advantages in cost and efficiency, the company can focus less on growing its data warehouse infrastructure and more on its core mission—delivering industry-leading data analytics capabilities to help telecommunications providers improve their profit margins.
Simple, Cloud-Based Data Integration

Loading data into your data warehouse is not a complex, time-consuming process. The Dell Quickstart Data Warehouse Appliance comes with Dell Boomi, a cloud-based service that includes built-in wizards and a powerful suggestion engine. You can use intuitive, drag-and-drop design tools to construct data extract, transform, and load (ETL) processes that automatically load data from your selected sources, including on-premises and cloud-based applications and databases.

Once you’ve designed your data integration processes, you can schedule, monitor, and manage all of them from a web-based console. Alerts let you know if a data load fails, and you can quickly drill down to identify and resolve issues.

Dell Boomi is designed to be scalable, secure, and highly available. Redundancy is built into every layer, and only authorized and authenticated users can access your tools and information. You can also encrypt your data to protect it throughout your ETL processes.

Fast Time to Insight through High-Performance Analytics

The Dell Quickstart Data Warehouse Appliance comes with Microsoft SQL Server 2012 Data Warehouse Appliance Edition. This pre-installed software includes all the data warehouse features of SQL Server 2012, including:

- The latest database engine, optimized for fast query performance and high data compression. Intel and Microsoft engineering teams worked closely together to optimize SQL Server 2012 (and the Windows Server operating system) for high performance on the Intel Xeon processor E5 family. Integrated support for data and backup compression add to these advantages. Compression not only reduces storage requirements, but also improves performance for many queries by enabling more data to be held in main memory, where it can be accessed orders of magnitude faster than from disk.

- xVelocity in-memory technologies, which can improve query speeds by an additional 10–100 times. In-memory processing greatly reduces the delays associated with accessing data from disk to enable dramatic performance increases for many queries. The efficient memory architecture and large cache (10 MB) of the Intel Xeon processor E5-2643 help to optimize speed and scalability for in-memory processing. The warehouse also supports columnar data structures, which are more efficient than traditional row-based structures for many analytic workloads.

- Up to 15,000 table partitions for faster data loads and additional query performance gains. With table partitioning, data can be accessed and processed more efficiently in parallel to increase overall throughput and to take better advantage of the parallel computing resources of the Intel Xeon processor E5 family.

- Remote BLOB Storage (RBS) for more comprehensive data integration. You can store binary large objects (BLOBs) in a dedicated external storage area, yet still access them as if they were stored directly in the data warehouse. With this support, you can integrate non-relational data into your data warehouse solution, such as files, audio, and video, to provide more comprehensive support for business data.

Self-Service BI Using Familiar Tools

The Dell Quickstart Data Warehouse supports integration with Microsoft BI tools (another SQL Server license is required). These tools can be deployed quickly on a separate server to provide powerful and flexible options for analyzing data and sharing insights. Authenticated users can be given role-based access to authorized tools and data sets so they can filter, combine, and process data and create high quality reports using familiar tools, including:

- Microsoft Excel for simple, self-serve data analysis and reporting.
- Microsoft SharePoint for sharing reports across the business.
- Microsoft® PowerPivot for Excel and SharePoint for extending these applications to support large data sets. PowerPivot supports xVelocity in-memory technologies and lets business users access and manipulate large data sets (up to billions of rows) with near-instant application response times.

- Microsoft® Business Intelligence Development Studio for creating more sophisticated analyses using software development tools specifically optimized for data analysis and BI solutions.

A Powerful, Efficient Hardware Platform

The hardware foundation for the Dell Quickstart Data Warehouse Appliance is a Dell PowerEdge 12th generation server based on the Intel Xeon processor E5-2643. The multi-core, multi-threaded architecture of the Intel Xeon processor E5 family combines high per-core performance with advanced parallelism for quick processing of multiple, simultaneous queries. A number of integrated technologies help to optimize performance for SQL Server 2012 in general and for data warehouse workloads in particular.
**Faster performance for peak workloads.** Intel® Turbo Boost Technology 2.0 works in combination with the Windows Server operating system to increase the clock speeds of individual cores beyond rating values for heavy workloads. With a base clock frequency of 3.3 GHz and a boost frequency of 3.5 GHz in this implementation, Intel Turbo Boost Technology has the potential to improve performance by as much as 6 percent per core. This second-generation technology provides more precise and granular control, which helps to enable more frequent and longer lasting bursts when power and thermal conditions allow.

**Enhanced parallelism for higher throughput.** With Intel® Hyper-Threading Technology, each core can simultaneously process two threads to improve utilization of available execution resources and to sustain higher performance levels. For example, if one thread stalls while waiting for data, the other can continue to execute.

**High-bandwidth, low-latency input/output (I/O) for rapid data flows.** Intel® Integrated I/O technology merges the I/O controller into the processor die, which reduces I/O latency by up to 30 percent. This technology supports the Peripheral Component Interconnect Express 3.0 (PCIe 3.0) specification, which doubles I/O bandwidth versus PCIe 2.0, so it also helps to increase overall I/O throughput. Intel® Data Direct I/O Technology (Intel® DDIO) adds to these benefits. By enabling data to be transferred directly from network adapters to processor cache, it can more than double I/O performance while simultaneously reducing processor overhead. It is ideal for accelerating high-volume data loads, so the data warehouse remains more productive.

The Dell PowerEdge 12th generation server is configured to take full advantage of the computing power of the Intel Xeon processor E5-2643. The Dell Quickstart Data Warehouse Appliance 2000 includes 128 GB of high-speed RAM for in-memory processing, PCIe 3.0 slots for high-speed I/O, and more than 23 TB of storage space on 26 internal drives to support all system storage requirements (12 TB out of the 23 TB are for source system extracted data [SSED], also known as user data). The appliance also includes a Dell PowerEdge RAID Controller (PERC) H710P to enable exceptionally fast data movement and advanced data protection with reduced processor overhead.

The database, logs, and operating system drives are all configured in mirrored pairs for high availability. The system also provides two global hot spare data disks. With this configuration, any of the 26 disks could fail and the system would remain up and running with no data loss.

**Complete Service and Support**

The Dell Quickstart Data Warehouse includes complete service and support. A Dell Data Warehouse Solution Architect comes to your site to consult with your team and help speed your time to value. Training and support options include:

- **Data warehouse fundamentals and operational best practices** regarding data management, data integration, architecture, design patterns, and more to provide you and your staff with a clear understanding of the basic principles, strategies, and requirements for maintaining an efficient and effective data warehouse.

- **Training and tips for using Dell Boomi and SQL Server 2012**, so you can load data into your warehouse more quickly, more accurately, and with less effort.

- **A hands-on workshop** focusing specifically on your unique BI initiatives as they relate to your data warehouse. The goal of the workshop is to provide practical guidance that can help you maximize the business value you can extract from your data.

- **One year of quarterly health checks**, including complete system performance diagnostics and optimization. Hardware, firmware, BIOS, SQL Server, and the data warehouse application architecture are all assessed by a Dell data warehouse solution architect, and recommendations are provided for optimizing all components of the solution stack.

- **A single-point-of-contact for all hardware and software questions** through the Dell Global Support team. Additional Dell Data Warehouse Consulting Services are available for expanding your business intelligence solutions and infrastructure. As your use of data becomes more sophisticated, Dell specialists can help you refine and expand your solution to extract increasing business value.

**Two Solutions to Choose from**

Dell offers two Quickstart Data Warehouse Appliances. Both come in a 2U enclosure and are preconfigured with all internal storage:

- **The Dell Quickstart Data Warehouse Appliance 1000** is designed to support 5 TB of user data and is appropriate for most small to medium-sized businesses and departments in larger companies.

- **The Dell Quickstart Data Warehouse Appliance 2000** is designed to support 12 TB of user data and to meet the needs of businesses with more demanding data requirements.
Software, functionality, and operational practices are the same for both systems. Simply choose the one that best fits your projected data volumes. If you deploy the Dell Quickstart Data Warehouse Appliance 1000, you can easily upgrade to the larger Dell Quickstart Data Warehouse Appliance 2000 configuration when your data volumes begin to approach the 5 TB limit. The upgrade process is simple and straightforward.

The Dell, Microsoft, and Intel Advantage

There are other database appliances on the market. A few, like the Dell Quickstart Data Warehouse Appliance, are specifically optimized for data warehouse workloads and for small to medium-sized businesses. They have small footprints, support roughly 1 to 15 terabytes of data, and are delivered ready to be dropped into existing data centers. However, not all data warehouse appliances are created equal. When evaluating options, be sure to consider each of the following issues.

Table 1. Dell Quickstart Data Warehouse Appliance specifications

<table>
<thead>
<tr>
<th>Component</th>
<th>Dell™ Quickstart Data Warehouse Appliance 1000 (up to 5 TB of user data)</th>
<th>Dell™ Quickstart Data Warehouse Appliance 2000 (Up to 12 TB of user data)</th>
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<tbody>
<tr>
<td>Included Software</td>
<td></td>
<td></td>
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<tr>
<td>Database</td>
<td>Microsoft® SQL Server® 2012 Data Warehouse Appliance Edition</td>
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<tr>
<td>Operating System</td>
<td>Windows Server® 2008 R2 SP1 Enterprise</td>
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<td>Data Integration</td>
<td>Dell Boomi® (one-year subscription)</td>
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<td>Server Management</td>
<td>Integrated Dell™ Remote Access Controller 7 (iDRAC7) Enterprise Edition</td>
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<td>Included Hardware</td>
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<td>Server</td>
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<tr>
<td>Processor</td>
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<tr>
<td>Sockets/Cores/Threads</td>
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<td>1/8/16</td>
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<td>128 GB RAM</td>
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<td></td>
<td>• 4 x 16 GB DDR3 DIMMs @1333 MHz</td>
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<td>• 4 x 8 GB DDR3 DIMMs @1333 MHz</td>
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<td>Internal Hard Drives</td>
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<td>22x 900 GB 10K 2.5&quot; SAS (18 data, 4 logs)</td>
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<td>4x 600 GB 10K 2.5&quot; SAS (2 hot spares, 2 OS)</td>
<td>4x 900 GB 10K 2.5&quot; SAS (2 hot spares, 2 OS)</td>
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<tr>
<td>Internal Controller</td>
<td>Dell™ PowerEdge™ RAID Controller (PERC) H710P</td>
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<td>Included Services</td>
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<td>Foundation Pack (32 hours)</td>
<td>Complete startup services, including post-installation hands-on training</td>
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<td>Health Checks (8 hours/quarter)</td>
<td>Quarterly performance assessment and optimization for one year following installation</td>
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<td>Dell Global Support</td>
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<td>Available Services</td>
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<tr>
<td>Dell Data Warehouse Consulting Services</td>
<td>For any additional data warehouse, analytics, and business intelligence needs</td>
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</table>
• **Cost.** The Dell Quickstart Data Warehouse Appliance is designed to deliver best-of-breed capabilities at the lowest possible cost. The purchase price includes all hardware and software for your data warehouse, plus services, initial training, and a full year of support. When evaluating appliances from other vendors, be sure to determine if you will need to purchase additional software components or services to support needed features, such as high availability or columnar data models.

• **Deployment Speed and Management Complexity.** The Dell Quickstart Data Warehouse Appliance is based on Microsoft SQL Server and Intel Xeon processors, so the core hardware and software platform is familiar to the broadest range of IT professionals. The appliance comes with an automated deployment script and on-site deployment and startup support. It also includes Dell Boomi, which is specifically designed to simplify one of the most challenging aspects of data warehousing: loading and integrating data from diverse data sources. By comparison, some appliances have proprietary hardware and software. They might also have management and integration interfaces that require special training and increase the time and effort required to deploy and manage the system.

• **Flexibility and Ease of Use.** To deliver high value, today’s BI solutions must be able to support all user groups, from expert data analysts and IT professionals to business decision makers that often have little or no experience with data management or analytics. The Dell Quickstart Data Warehouse Appliance provides an excellent foundation for supporting all these user groups through native integration with Microsoft BI tools. It lets the largest potential user group, business decision makers, easily explore, analyze, and share information using some of their most familiar business tools, such as Microsoft Excel.

• **Performance and Scalability.** Be wary of general-purpose database appliances that are not specifically optimized for data warehouse workloads. As discussed in this paper, performance limitations can lead to long user wait times, lower capacity, and higher administrative overhead. The Dell Quickstart Data Warehouse Appliance is based on high-performing Intel Xeon processors and is designed and tuned specifically for data warehouse workloads.

**Conclusion**

Many of today’s most successful businesses have deployed data warehouses so they can aggregate and analyze their data to provide better insight into their customers, markets, and operations. Until recently, deploying a data warehouse was a resource-intensive undertaking, involving high costs, long project timelines, and considerable risk.

With the Dell Quickstart Data Warehouse Appliance, organizations can deploy a highly optimized data warehouse in just hours, and begin creating their database and loading their data almost immediately. By combining best-of-breed technologies and services from Intel, Microsoft, and Dell, this appliance eliminates many of the challenges of traditional, build-your-own data warehouse strategies.

The power of the latest Intel Xeon processor E5 family helps to ensure high performance in a small data center footprint, while native integration with Microsoft business intelligence tools makes it easy for decision makers throughout the business to access, combine, and analyze data using familiar tools, such as Microsoft Excel. With this foundation, businesses can use the Dell Quickstart Data Warehouse Appliance to transform massive and growing data volumes into insight quickly and flexibly to help them compete more effectively in today’s increasingly data-driven business environment.
Additional Resources

- **Key Considerations in Evaluating Data Warehouse Appliances**
  (Dell white paper)

- **Dell Quickstart Data Warehouse Appliance Datasheet**

- **Microsoft SQL Server 2012 Fast Track Data Warehouse reference architecture**

- **Intel Xeon processor E5 family product brief**

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1 Interview with a senior solutions engineer of a company that is currently using a Dell™ Quickstart Data Warehouse Appliance in production to support data analytics for one of its telecommunications customers. The interview was conducted on December 20, 2012.


6 SQL Server 2012 provides full support for data warehousing. It supports integration with Microsoft BI tools, which must be purchased separately (another SQL Server license is required) and deployed on a separate server.

7 Requires a system with Intel® Turbo Boost Technology capability. Intel Turbo Boost Technology 2.0 is the next generation of Turbo Boost Technology and is only available on select Intel® processors. Consult your PC manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit [http://www.intel.com/go/turbo](http://www.intel.com/go/turbo).

8 Intel internal measurements of average time for an I/O device read to local system memory under idle conditions comparing the Intel® Xeon® processor E5-2600 product family (230 re) versus the Intel® Xeon® processor 5500 series (340 re). Baseline Configuration: Green City system with two Intel® Xeon® processors E5520 (2.26GHz, 4C). 128GB memory @1333, C-States Disabled, Turbo Disabled, SMT Disabled. New Configuration: Meridian system with two Intel® Xeon processors E5-2665 (2.4GHz, 8C). 32GB memory @1600 MHz, C-States Enabled, Turbo Enabled. The measurements were taken with a LeCroy* PCIe* protocol analyzer using Intel internal Rubicon (PCIe* 2.0) and Florin (PCIe* 3.0) test cards running under Windows* 2008 R2 x64.


10 Intel Xeon processor E5 family product versus the Intel® Xeon® processor E5520. The measurements were taken with a LeCroy* PCIe* protocol analyzer using Intel internal Rubicon (PCIe* 2.0) and Florin (PCIe* 3.0) test cards running under Windows* 2008 R2 x64.

11 Source: Internal Intel measurements have shown I/O performance gains of up to 2.3X using Intel® Data Direct I/O Technology comparing one-socket SB8 data for an L2 forwarding test using 8x10 Gigabit Ethernet ports for the Intel® Xeon® processor E5 product family versus the Intel® Xeon® processor 5600 series.