Overview

Exadata is Oracle’s fastest growing new product. Much of the growth of Exadata has come at the expense of specialized data warehouse appliance vendors. These vendors have published competitive comparisons to Exadata, claiming:

- Architecture is what really matters for performance
- Purpose-built data warehousing architectures perform best

They see architecture as an end in itself rather than as a means to an end.

The high-level architectural debate will go on forever because no vendor will ever admit to having an inferior architecture. Ultimately, customers should judge products by results, not architectural claims. The same vendors that claim architectural superiority don’t disclose basic performance metrics for their products since they fall well short of Exadata.

On the subject of architecture, all vendors, including Oracle, agree that “scale-out” architectures are best for performance. Scale-out architectures increase performance linearly as servers are added. Oracle’s Exadata architecture uses scale-out for both compute and storage, and goes further than alternatives by executing some database functions in the storage layer. All the processors in both compute and storage servers are thus database processors.

Beyond scale-out, the main difference in architectures is the degree of sharing of storage. Some vendors claim that storage sharing does not scale. Oracle Exadata uses a scalable InfiniBand fabric to connect servers to storage. InfiniBand is widely used in the high performance computing community for high bandwidth connectivity of clusters with tens of thousands of nodes. So the claim that this architecture cannot scale in database clusters that are ten to one hundred times smaller is based on ignorance of the facts.

Exadata Performance is Superior

The primary data warehousing appliance vendors have published Exadata competitive documents without including a single performance number, despite pages devoted to the topic of performance. Quite simply, this is because their bottom line performance is lacking. In
contrast, Exadata performance is outstanding, so Oracle is happy to disclose performance metrics in detail to allow customers to easily judge which product really performs best.

Sequential I/O Performance

Sequential processing, which is common in data warehousing, reporting, and batch operations, is dominated by how quickly large amounts of data can be read from storage. A full-rack Exadata Database Machine contains 14 Exadata Storage Servers, each with 12 disk drives and 4 Flash cards used to offload I/Os from disk. A full-rack Exadata achieves a throughput of 25 Gigabytes per second from disk. I/O from Flash produces a full-rack throughput of 75 Gigabytes per second. This throughput is measured on real systems running SQL, not calculated by adding the theoretical bandwidth of low level components. The throughput of Exadata increases linearly as more nodes are added to the configuration.

Competitors that talk endlessly about their purported architectural advantages in practice fail to deliver performance that comes close to Exadata. **Exadata delivers more than twice the performance of the next closest competitor** – and in some cases, 5 - 10 times more.

Random I/O Performance

OLTP is typically dominated by many simultaneous users accessing different records through random (non-sequential) reads and writes. I/O operations per second (IOPS) is the best measure of performance for transaction processing. A **full-rack Exadata Database Machine can easily perform up to 1,500,000 IOPS** when reading from Flash; considerably more than is required for the largest applications. Exadata further includes built-in intelligence that decides which records to cache in Flash, based on the likelihood of subsequent access, further increasing the chance that an I/O is resolved from Flash. Appliances can't perform OLTP operations, nor can they handle consolidated workloads. There simply is no comparison.

**Exadata is “Purpose Built” for Data Warehousing**

Competitors try to position Exadata’s OLTP capabilities as a liability. In fact, there is no trade-off between OLTP and Warehousing. Exadata is easily the most “purpose-built” warehouse product on the market, encompassing over 30 years of development specifically focused on warehouse workloads.
For example, Exadata has greatly superior data compression capabilities, making Exadata a much more effective and lower cost choice for large warehouses. The Oracle Database’s built-in analytics, data mining and OLAP execute directly against operational databases, without any loading or transformations. Warehouse specialists are just starting to add these capabilities that Oracle added many years ago and has matured over several releases.

Furthermore, “purpose-built” data warehousing products are incomplete in many dimensions. They lack high-availability features, data types, and security capabilities important for warehousing applications. By positioning their products as “purpose-built” for warehousing, specialty vendors hope to deflect attention from their poor backup and recovery capabilities, practically non-existent disaster recovery, lack of transparent data encryption, poor support for hundreds or thousands of users, and other important operational capabilities. In many ways, they are simply incomplete products portrayed as specialized.

Further, by choosing a specialized product rather than a general purpose product, a customer must hire and train a new team of specialists to manage, update, and maintain the specialty product. Typically this will require at least four or five dedicated specialists to provide 24x7x365 coverage.

Exadata is the Real Deal

Exadata is experiencing tremendous growth as Global 2000 companies in every industry and geography thoroughly test and measure its capabilities and choose Exadata over its competitors.

Warehouse appliance vendors would like you to believe they have superior architectures, but the simple performance numbers demonstrate that Exadata is both faster and more capable.

“With our migration to Exadata V2 we’ve seen a 17x performance improvement, having made no changes to our application.”
— JIM DUFFY, BNP Paribas

“Our reports are running a computed average of 10x faster, using Oracle Exadata Database Machine.”
— DOUG MILLER, RL Polk