An Oracle Technical White Paper

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Sizing Guide for Single Click Configurations of Oracle's MySQL on Sun Fire x86 Servers

Introduction

Oracle's industry-leading applications and database can be best utilized if they are hosted on Oracle hardware and managed by Oracle's management tools. Oracle's Single Click offerings, which include configurations for the Oracle Database and for Oracle's MySQL Database, are tightly integrated systems that greatly simplify deployment and management of database server and software. The Single Click configurations of Oracle's MySQL on Sun Fire x86 servers from Oracle are based on the trusted open source MySQL Database and take advantage of Oracle technologies from applications to disk to deliver unmatched performance and scalability along with superior TCO.

This white paper provides sizing for system configurations designed to address common enterprise requirements. These configurations are designed to simplify the process of getting started with the Oracle Red Stack. With the proposed configurations, Oracle is reducing the amount of time it would otherwise take to set up and configure the servers along with layers of software. These solutions also reduce risk and save time by specifying the correct amount of memory, storage, and I/O bandwidth that is needed to support the selected workloads. The proposed configurations in this white paper can be treated as starting points. It is very simple to expand the system resources and application capabilities to meet the needs of an expanding business.

Foundation for an Enterprise Infrastructure

The Single Click configurations provide a foundation for delivering enterprise reliability and performance on an x86 infrastructure. Key technologies in the offering include Oracle's Sun Fire x86 servers, Oracle MySQL, and Oracle Linux.

Sun Fire x86 Servers

Sun Fire x86 servers provide enterprise RAS features in cost-effective platforms. Integrated Lights Out Manager (ILOM) and hot-swappable components also make the systems easy and cost-effective to manage. In addition, Sun Fire x86 servers fully integrate into Oracle management tools, allowing for a single management interface for Oracle applications, operating systems, and hardware.

MySQL

MySQL is the most trusted and depended upon open source database platform in use today. Many of the most popular and highly trafficked Web sites in the world are built on MySQL for its well-known performance, reliability, and ease of use. With MySQL, Oracle now provides a complete LAMP (Linux, Apache, MySQL, PHP, Perl, Python, etc.) stack that allows users and customers of any size or ambition to build applications and products that leverage the best available technology solutions and support. MySQL 5.5 delivers a better MySQL by providing a feature set that greatly improves performance, scalability, and usability specifically on today's modern, multi-processing hardware, software, and middleware architectures.

Oracle Linux

Oracle Linux, which has been optimized to run on Sun x86 systems from Oracle, brings the Oracle hardware and application stack together. Oracle Linux has been built and tested to run Oracle hardware, databases, and middleware, and it is recommended for all enterprise applications. It is based on Oracle's Unbreakable Enterprise Kernel and offers the latest Linux innovations while delivering extreme performance as well as advanced scalability and reliability for enterprise applications.

Key advantages of using Oracle Linux instead of a Red Hat 5 Compatible Kernel include:

- Greater than 75 percent improvement in OLTP performance
- 200 percent speedup of InfiniBand messaging
- 137 percent faster solid-state disk (SSD) access

Single Click Configurations

To simplify the process of building out a MySQL database environment, Oracle has developed Single Click configurations that include all the necessary CPU, memory, and storage resources to meet predetermined levels of user demand. Oracle offers several different Single Click configuration options to start from, as shown in Table 1.

TABLE 1. SINGLE CLICK CONFIGURATIONS AT A GLANCE

	ENTRY CONFIGURATION	STANDARD CONFIGURATION	POWER CONFIGURATION
DB USERS*	Up to 50	Up to 200	Up to 1000
DB SIZE (TB)	1.8	3	4.2
LICENSED X86 CPU CORES	Eight at 2.4 GHz	12 at 3.06 GHz	12 at 3.46 GHz
SYSTEM MEMORY SIZE	48 GB	96 GB	144 GB
BASIC SERVER MODELS	Sun Fire X4170 M2 server	Sun Fire X4170 M2 server	Sun Fire X4270 M2 server
SERVER COUNT	1	2	2
MYSQL DATABASE EDITION	MySQL 5.5 Enterprise Edition	MySQL 5.5 Enterprise Edition	MySQL 5.5 Enterprise Edition

* A DB user is a database user that can be of any load type (OLTP, Analytic, Reporting, etc.)

These configurations take advantage of the latest Sun Fire x86 server hardware technologies using the 1 rack unit (RU) Sun Fire X4170 M2 and the 2 RU Sun Fire X4270 M2. In addition, Oracle Linux and Oracle's MySQL have also been provided with reduced TCO in mind. More details on each of these Single Click configurations can be found within this white paper.

The sizing metric used for building these configurations is the maximum number of database users of different mixed types, including OLTP, OLAP, Reporting, and so on with a mix of concurrent read users and write users.

Single Click Entry Configuration

The Single Click Entry Configuration, which supports up to 50 database users, is intended to be the launching point for MySQL for x86 environments. Utilizing Oracle's Sun Fire X4170 M2 server with Oracle's MySQL Enterprise Edition allows customers to take advantage of the full feature set that MySQL Enterprise Edition provides. The Single Click Entry Configuration offers four processing cores with an initial 48 GB of low-voltage memory and 1.8 TB of usable database space. This is just a starting configuration that can also be built upon using MySQL's expandability with MySQL Replication or MySQL Cluster to bring in additional processing nodes.

Included with MySQL Enterprise Edition is MySQL Enterprise Backup. MySQL Enterprise Backup performs online non-blocking backups of MySQL databases. Full backups can be performed on all database data while MySQL is online without interrupting queries or updates. In addition, incremental backups are supported wherein only data that has changed from a previous backup operation is backed up. Also partial backups are supported when only certain tables or tablespaces need to be backed up.

Packing the optimal balance of compute power, memory capacity, and I/O capability into a compact and energy efficient 1 RU enclosure, the Sun Fire X4170 M2 server is the most versatile IT infrastructure building block.

Figure 1. Sun Fire X4170 M2 server.

The Sun Fire X4170 M2 server utilizes the Intel Xeon processor 5600 Series and offers unparalleled performance balanced with compute, memory, and I/O capabilities, making it the most versatile building block for a number of IT applications including MySQL Database.

Single Click Entry Configuration Details

Table 2 provides a detailed breakdown for the Single Click Entry Configuration.

TABLE 2. DETAILED SINGLE CLICK ENTRY CONFIGURATION

CATEGORY	MARKETING PART NUMBER	DESCRIPTION	QTY
BASE CHASSIS	X4170M2-H1-AA	Sun Fire X4170 M2 base chassis package with 1x PSU	1
PROCESSOR	5924A	E5649 (4c, 2.40 GHz, 5.86 GT/s QPI, 80W)	1
	5898A-N	Processor heat sink for Sun Fire X4170 M2 server	1
MEMORY	4911A	8 GB low-voltage DDR3 memory kit: 1 x 8 GB 1066 MHz registered ECC DDR3 DIMM RoHS-6, ATO	6
STORAGE	RA-SS2CF-300G10K-N	300 GB/10K RPM SFF SAS drive mounted in Marlin bracket, ATO	2
	RA-SS2CF-600G10K2	600 GB/10K RPM SFF SAS drive mounted in Marlin bracket, ATO	4
MISCELLANEOUS	SG-SAS6-R-INT-Z	SAS II RAID 0,1,5,6 HBA	1
	5932A	Second hot-swappable 760W gold PSU	1
	8325A-N	DVD+/-RW drive	1
	6326A-N	Tooled rack mount slide rail kit for Sun Fire X4170 M2	1
		Power cable TBD based on country (depends on NEMA and IEC requirements)	2
FILLER PANELS	5879A-N	Memory slot filler panel: RoHS-6 (auto-configured by W5C), ATO	12
	6331A-N	2.5-inch HDD filler panel: RoHS-6 (auto-configured by W5C), ATO	2
SOFTWARE-RELATED ITEMS		Oracle Linux 5.7, 64-bit	1
		MySQL 5.5 Enterprise Edition	1
DISK LAYOUT	RAID 1 (2 x 300 GB) = 300 GB RAID 5 (4 x 600 GB) = 1800 GB 300 GB LogicalVolume0 for OS 1800 GB LogicalVolume1 for DB		

Single Click Standard Configuration

The Single Click Standard Configuration, which supports up to 200 database users, builds on the Single Click Entry Configuration utilizing the Sun Fire X4170 M2 and provides additional memory, processing cores, and disk space. The Single Click Standard Configuration provides twelve computational cores rated at a higher frequency (3.06 GHz), 96 GB of low-voltage memory, and 3 TB of usable database space per server within the configuration.

In addition to this increase in available processing resources, the Single Click Standard Configuration includes two servers intended to be configured in a MySQL replication group. MySQL Replication is a simple way for customers to rapidly create multiple replicas of their database to scale-out beyond the capacity constraints of a single instance, enabling them to serve rapidly growing database workloads. MySQL Replication asynchronously replicates a MySQL database server (master) to multiple MySQL database servers (slaves), spreading the workload among multiple database servers to improve read performance and availability. MySQL Replication combined with MySQL Enterprise Backup provides another level of availability by providing on-line non-blocking backups of the master database while the master database is being replicated to the slave servers.

Single Click Standard Configuration Details

Table 3 provides a detailed breakdown for the Single Click Standard Configuration.

TABLE 3. DETAILED SINGLE CLICK STANDARD CONFIGURATION

CATEGORY	MARKETING PART NUMBER	DESCRIPTION	QTY
BASE CHASSIS	X4170M2-H1-AA	Sun Fire X4170 M2 base chassis package with 1x PSU	2
PROCESSOR	4373A	X5675(6c, 3.06 Ghz, 6.4 GT/s QPI, 95W)	4
	5898A-N	Processor heat sink for Sun Fire X4170 M2 server	4
MEMORY	4911A	8 GB low-voltage DDR3 memory kit: 1 x 8 GB 1066 MHz registered ECC DDR3 DIMM RoHS-6, ATO	24
STORAGE	RA-SS2CF-300G10K-N	300 GB/10K RPM SFF SAS drive mounted in Marlin bracket, ATO	4
	RA-SS2CF-600G10K2	600 GB/10K RPM SFF SAS drive mounted in Marlin bracket, ATO	12
MISCELLANEOUS	SG-SAS6-R-INT-Z	SAS II RAID 0,1,5,6 HBA	2
	8325A-N	DVD+/-RW drive	2
	5932A	Second hot-swappable 760W gold PSU	2
	6326A-N	Tooled rack mount slide rail kit for Sun Fire X4170 M2 server	2
		Power cable TBD based on country (depends on NEMA and IEC requirements)	4
FILLER PANELS	5879A-N	Memory slot filler panel: RoHS-6 (auto-configured by W5C), ATO	12
SOFTWARE-RELATED ITEMS		Oracle Linux 5.7, 64-bit	1
		MySQL 5.5 Enterprise Edition	2
DISK LAYOUT	RAID 1 (2 x 300 GB) = 300 GB RAID 5 (6 x 600 GB) = 3 TB 300 GB LogicalVolume0 for OS 3 TB GB LogicalVolume1 for DB		

* This configuration is for two servers that are intended for replication.

Single Click Power Configuration

The Single Click Power Configuration, which supports up to 1,000 database users, takes a step to the next level by leveraging Oracle's Sun Fire X4270 M2 server powered by two of the highest performing Intel Xeon processor 5600 Series. This configuration offers superior scalability with maximum performance, higher amounts of memory, robust I/O bandwidth, and unique I/O storage capabilities in a compact 2 RU system.

Figure 2. Sun Fire X4270 M2 server.

The Single Click Power Configuration provides twelve computational cores, similar to the Single Click Standard Configuration, but it runs at a much higher frequency (3.46 GHz). In addition, the Single Click Power Configuration utilizes the internal disk density capability to provide improved reliability and performance by using RAID 10 configuration for the database disk space. In addition, it provides a total of 4.2 TB of database disk space, which is 1.2 TB more than the Single Click Standard Configuration. Finally, the Single Click Power Configuration is also configured to supply much higher memory capacity, implementing 144 GB of low-voltage memory.

Similar to the Single Click Standard Configuration, the Single Click Power Configuration consists of two Sun Fire X4270 M2 servers in a replication group also utilizing MySQL Enterprise Backup.

Single Click Power Configuration Details

Table 4 provides detailed configuration information for the Single Click Power Configuration.

TABLE 4. DETAILED SINGLE CLICK POWER CONFIGURATION

CATEGORY	MARKETING PART NUMBER	DESCRIPTION	QTY
BASE CHASSIS	X4270M2-H1-AB	Sun Fire X4270 M2 base chassis for 2.5-inch HDD with 1x PSU	2
PROCESSOR	4375A	X5690 (6c, 3.46 GHz, 6.4 GT/s QPI, 130W)	4
	5899A-N	Processor heat sink for Sun Fire X4270 M2 server	4
MEMORY	4911A	8 GB low-voltage DDR3 memory kit: 1 x 8GB 1066 MHz registered ECC DDR3 DIMM RoHS-6, ATO	36
STORAGE	RA-SS2CF-300G10K-N	300 GB/10K RPM SFF SAS drive mounted in Marlin bracket, ATO	4
	RA-SS2CF-600G10K2	600 GB/10K RPM SFF SAS drive mounted in Marlin bracket, ATO	28
MISCELLANEOUS	SG-SAS6-R-INT-Z	SAS II RAID 0,1,5,6 HBA	2
	5933A	Second hot-swappable 1200W PSU	2
	7100714 (pre-7/12) 5906A (post-7/12)	Tooled rack mount slide rail kit for Sun Fire X4270 M2 server	2
		Power cable TBD based on country (depends on NEMA and IEC requirements)	4
FILLER PANELS	6331A-N	2.5-inch HDD filler panel: RoHS-6 (auto-configured by W5C), ATO	16
SOFTWARE-RELATED ITEMS		Oracle Linux 5.7, 64-bit	2
		MySQL 5.5 Enterprise Edition	2
DISK LAYOUT	RAID 1 (2 x 300 GB) = 300 GB RAID 10 (14 x 600 GB) = 4.2 TB (RAID 10 provides better performance and reliability.) 300 GB LogicalVolume0 for OS 3 TB GB LogicalVolume1 for DB		

* This configuration is for two servers that are intended for replication.

Conclusion

Leveraging the Oracle stack of products integrated with Oracle's renowned support, the Oracle Single Click configurations virtually eliminate the struggles associated with planning and building out an initial database. These configurations are meant to help as a starting point, but they are by no means a limiting factor. These configurations can easily grow as business demands increase while continuing to provide the best TCO and ROI.

For More Information

For further information and available product feature details, please visit the Oracle Web sites listed in Table 5. For additional information about installing and configuring the Oracle Linux operating system and Oracle's MySQL Database when deploying these Single Click configurations, refer to the "Installation Guide for Single Click Configurations of Oracle's MySQL 5 with Oracle Linux 5 for Sun Fire x86 Servers."

TABLE 5: LINKS TO ADDITIONAL INFORMATION

ORACLE PRODUCT OFFERING	WEB SITE URL
Oracle's Sun Fire x86 servers:	http://www.oracle.com/goto/x86
Oracle Linux:	http://www.oracle.com/us/technologies/linux/
Oracle's MySQL:	http://www.mysql.com/
Oracle's MySQL Enterprise Edition:	http://www.mysql.com/products/enterprise/
Oracle 's MySQL 5.5 Reference Manual:	http://dev.mysql.com/doc/refman/5.5/en/

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