GemStone S 64

The Gemstone/S 64 Bit Smalltalk Object Server:
Building Enterprise Applications in a Scalable, Secure, Persistent, Distributed Object Environment

The GemStone/S™ family of Smalltalk object persistence and application servers provides an advanced platform for developing, deploying and managing scalable, high-performance, distributed multi-tier applications.

In today's competitive business environment, corporations need technology that enables dynamic, responsive business applications. They need to provide better, faster ways to manage and access data and put more knowledge at the fingertips of the user.

For almost two decades, financial institutions, telecommunications, manufacturing, transportation and utility companies have chosen GemStone/S, the original 32-bit GemStone/S object server, to provide these capabilities. The new GemStone/S 64 Bit Smalltalk object server increases scalability and performance to allow full utilization of the power of 64 bit computing within the proven technology of GemStone/S. The GemStone/S family of products provides the robust, scalable, secure, and flexible environment required for mission-critical 24x7 applications.

A GemStone/S 64 Bit object server is the centerpiece of your multi-tier system architecture. It integrates with Smalltalk or C clients on the front end. The active, multi-user,

transactional Smalltalk execution engine is integrated into the server. Its unique Persistent Cache Architecture™ (PCA) technology provides a central environment for managing billions of objects and hundreds of gigabytes of data and supporting thousands of concurrent users.

On the back end, GemStone/S 64 Bit directly integrates with the Oracle relational database management system through the use of GemConnect®. An open and extensible architecture enables developers to build interfaces and wrappers to integrate numerous corporate information resources; everything from data warehouses to machine control systems.

BENEFITS:

Smalltalk ease of use: GemStone/S 64 Bit object server, like GemStone/S, is based on Smalltalk—a mature, industry-standard language. For developers who have written Smalltalk applications will find it easy to build applications in GemStone/S 64 Bit. GemStone/S 64 Bit uses the same object model as Smalltalk, enabling seamless integration with your existing Smalltalk applications.

Open, flexible development environment: Applications based on GemStone/S 64 Bit use a variety of visual application development environments—along with business modeling, object analysis, and design tools. The open development environment allows user interfaces to be written using Smalltalk tools such as Cincom's VisualWorks, IBM's VisualAge for Smalltalk, and Instantiations's VA Smalltalk. These interfaces link directly to application components and business objects hosted in GemStone/S 64 Bit. The language-independent architecture ensures that all applications have full read-write concurrent access to shared objects.

Active Smalltalk execution engine: GemStone/S 64 Bit integrates the active Smalltalk execution engine, providing maximum performance and support for application partitioning. Smalltalk code executes directly in the server, where your persistent data is stored, rather than requiring data to be transferred to the client. For easy development and maintenance, GemStone/S 64 Bit is compliant with the ANSI X3J20 Smalltalk standard. Other benefits include:

- Support for data definition, manipulation, and indexing and querying of variable-sized, large object sets.
- Methods are callable from Smalltalk, Java, or C. All language interfaces are bi-directional.
- Schemas can be modified dynamically with class versions, or maintained in a class history. Instances can migrate from one class version to another, in ways that allow for extensible, user-defined mappings.

Multi-User Scalability in a Persistent Environment: GemStone/S 64 Bit is designed to deliver a large-scale, multi-user solution that provides a secure, persistent environment. GemStone/S 64 Bit uses efficient shared memory and object-caching technology. All processes use the shared memory cache, minimizing disk I/O and expensive interprocess communication. The Smalltalk execution engine caches methods as your application runs, dramatically improving performance. Accessed objects are cached in memory until the space they occupy is needed. As a result, frequently accessed objects do not need to be read from the disk by each session,

disk writes of modified objects can be deferred. The GemStone/S family of products supports symmetrical multi-processing and clustered systems architecture, whether UNIX or Windows-based, such as IBM's SP series or HP's HP9000 Parallel Enterprise Server.

Advanced locking technology and concurrency controls: For high performance and data consistency in large-scale, multi-user environments, GemStone/S 64 Bit provides a complete object transaction management system. Benefits include:

- Optional explicit locking uses combinations of read and write locks to ensure complete control over transaction concurrency.
- Protocols are provided for requesting locks on individual client Smalltalk objects and collections of objects, giving developers fine-grained control over concurrent access to objects.
- Optimized queue and collection classes utilize semantic concurrency control to minimize conflicts and increase throughput, without locking in applications where high concurrency is required.
- Applications can access persistent objects outside of a transaction.

Transactional support: GemStone/S 64 Bit offers a fault-tolerant transaction framework for reliable, continuous 24x7 application use. Transactions are atomic, consistent, isolated, and durable. The logging subsystem allows complete failure recovery and uses asynchronous disk writes for high performance. GemStone/S 64 Bit enables you to distribute object processing across large-scale, heterogeneous networks. Differences between machine architecture and data formats are handled transparently. It automatically coordinates transactions across platforms, providing distributed transaction consistency without additional coding to take advantage of available processing power and accommodate growth.

Persistent Cache Architecture™ technology: Highly scalable, transactional PCA technology is at the heart of the

GemStone/S family of products. This unique technology integrates a server-optimized Smalltalk virtual machine, a RAM-based shared object cache, and a disk-based persistent Smalltalk object store. PCA technology provides efficient storage and access to large numbers of shared objects. It includes the full range of production features such as online garbage collection, object caching, and dynamic schema modification. Object persistence is on an instance basis (determined by reachability from other persistent objects). In a three-tier system with GemConnect, the object/relational mapping function can take place on the middle tier so that client objects communicate efficiently with server objects. The shared PCA technology reduces the frequency of database access, improving data availability for other applications.

System administration tools: GemStone/S 64 Bit includes a full set of system administration tools. Using various interfaces, system administration can be performed directly from a Smalltalk client or from an operating system shell script. Benefits include:

- Secure user and group read-write access.
- Full online backup that can be written directly to tape.
- Automatic crash recovery using the transaction logs to redo transactions committed since the last checkpoint.
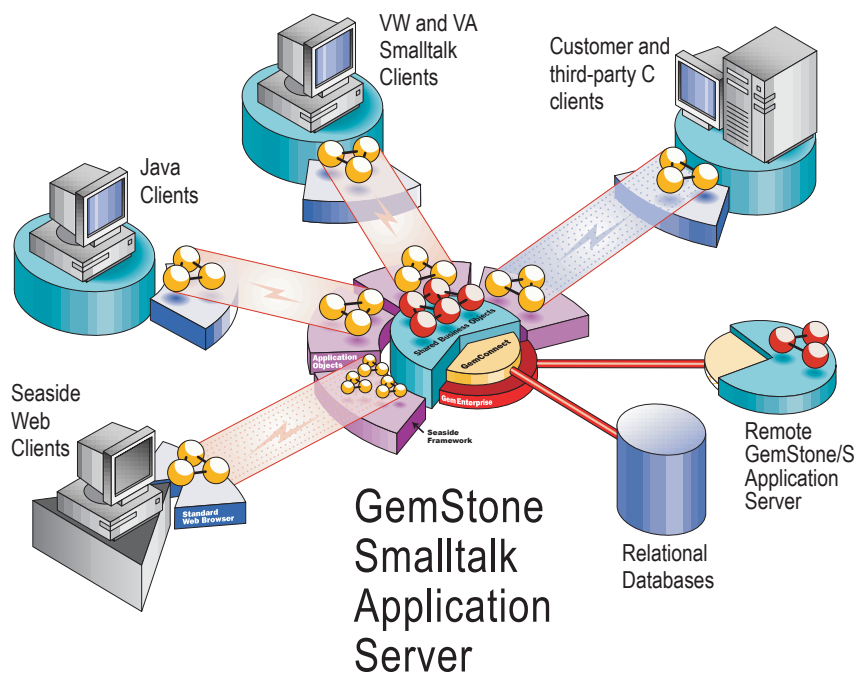- Extensive system statistics for performance tuning, including

a graphical tool to display current or archived system statistics.

Supported GemStone/S platforms:
- Solaris 2.8, 2.9, and 2.10
- HP-UX 11.0/11i
- AIX 5.1, 5.2, 5.3
- Windows 2000, Windows XP and Windows 2003
- Red Hat Enterprise Linux 4 or SUSE Linux Enterprise Server 9

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- AIX 5.2, 5.3
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VW and VA Smalltalk Clients

Customer and third-party C clients

Java Clients

Seaside Web Clients

Remote GemStone/S Application Server

Relational Databases

GemStone Smalltalk Application Server

GEMSTONE®