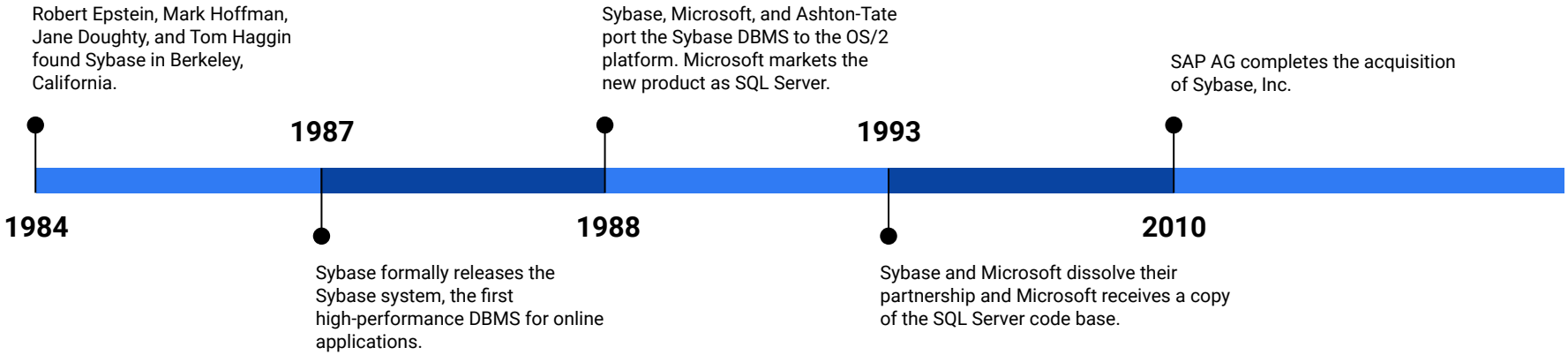
Sybase

Presentation By: Bhakta, Tejash
Jain, Harsh Manoj

History


Robert Epstein, Mark Hoffman, Jane Doughty, and Tom Haggin found Sybase in Berkeley, California.
1984
1987
Sybase formally releases the Sybase system, the first high-performance DBMS for online applications.
1988
Sybase, Microsoft, and Ashton-Tate port the Sybase DBMS to the OS/2 platform. Microsoft markets the new product as SQL Server.
1993
Sybase and Microsoft dissolve their partnership and Microsoft receives a copy of the SQL Server code base.
2010
SAP AG completes the acquisition of Sybase, Inc.

Products

Data management products

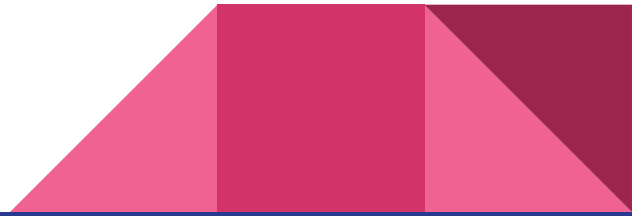
- **Adaptive Server Enterprise (ASE)** – Enterprise Class RDBMS, with a data analytics warehouse system
- **Advantage Database Server (ADS)** – RDBMS
- **Sybase Replication Server** – a vendor-neutral data-movement system

Analytics products

- **Sybase IQ** – an analytics data warehousing and business intelligence RDBMS

Mobility products

- **SQL Anywhere** – RDBMS designed for mobility



Adaptive Server Enterprise (ASE)

ASE is an enterprise class RDBMS which began as a collaboration between Sybase, Microsoft and Ashton-Tate. When the agreement expired, Microsoft purchased a license of the source code and began to sell it as Microsoft SQL Server.

Features:

1. **High Availability and Disaster Recovery (HADR) System**
   - Primary designated server where all the transaction processing takes place
   - Standby server
   - Disaster Recovery (DR) node

2. **ASE Cockpit**
   - Provides a web-based console for real-time performance, status and availability monitoring of ASE host
   - Includes threshold-based alerts and notifications

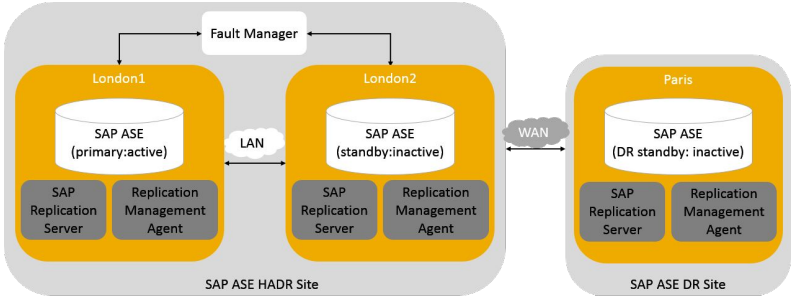


Figure 1: HADR System with DR Node

Figure 1: HADR System with DR Node. Retrieved from https://help.sap.com/viewer/38af74a09e48457ab699e83f6dfb051a/16.0.3.7/en-US

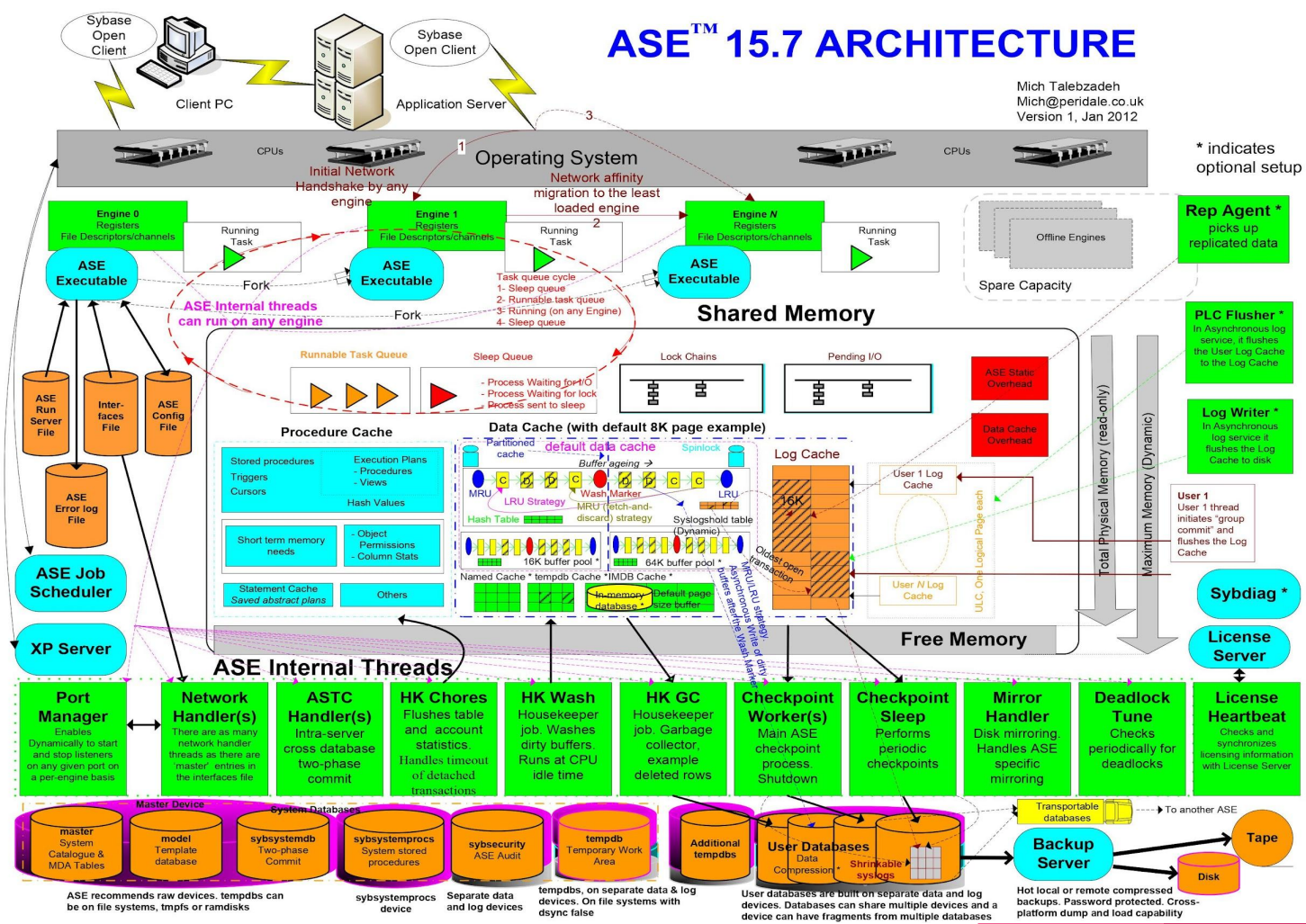


Figure 2: ASE 15.7 Architecture. Retrieved from https://talebzadehmich.files.wordpress.com/2012/02/ase15-7_architecture.pdf

How is the Data stored?

- Tables are stored in **segments**; a segment is an area within a device, with a name and a size, that is allocated for a database.

- **Page** - basic unit of storage in ASE
  - Page size can be 2K, 4K, 8K to 16K (bytes).

- **Types of Pages:**
  - Data Page - stores the data rows for a table
  - Index Page - stores the index rows for all levels of an index
  - Large object (LOB) pages - stores the data for text and columns, and for Java off-row columns.

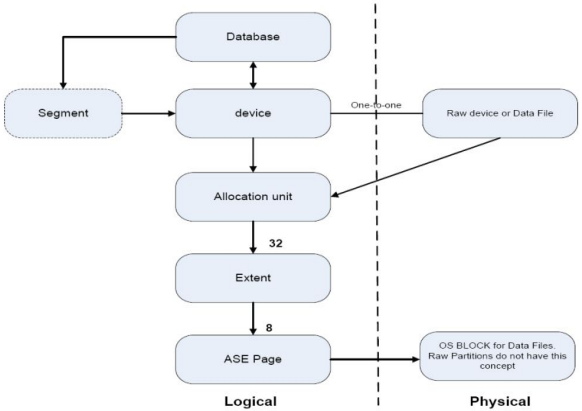


Figure 3: Relationship between Logical and Physical storage schemas in ASE.[3]

[3]Talebzadeh, Mich. Oracle and Sybase, Concepts and Contrasts(2006). Retrieved from http://www.peridale.co.uk/oracle_and_sybase_article.pdf. p 10

Number of rows per data page

The number of rows allowed for a DOL data page is determined by:

- The page size
- A 10-byte overhead for the row ID, which specifies a row-forwarding address.

Table 1: Maximum number of data rows for a DOL table[4]

Page Size	Maximum number of rows
2K	166
4K	337
8K	678
16K	1361

[4] Adaptive Server Enterprise. Performance and Tuning: Basics.
Retrieved from http://infocenter.sybase.com/help/topic/com.sybase.dc20020_1251/pdf/databases.pdf. p 166

Indexing Mechanisms

Adaptive Server provides two types of indexes:

1. Clustered indexes, where the table data is physically stored in the order of the keys on the index:

    - For allpages-locked tables, rows are stored in key order on pages, and pages are linked in key order.
    - For data-only-locked tables, indexes are used to direct the storage of data on rows and pages, but strict key ordering is not maintained.

    → Adaptive Server uses B-tree indexing, so each node in the index structure can have multiple children.
    → The table with no clustered index is stored as a heap.

2. Nonclustered indexes, where the storage order of data in the table is not related to index keys

B-tree Indexing

Indexes can have multiple levels:

- Root Level - Highest level of the index.
- Leaf Level - Lowest level of the index.
- Intermediate Level - All levels between root and leaf level

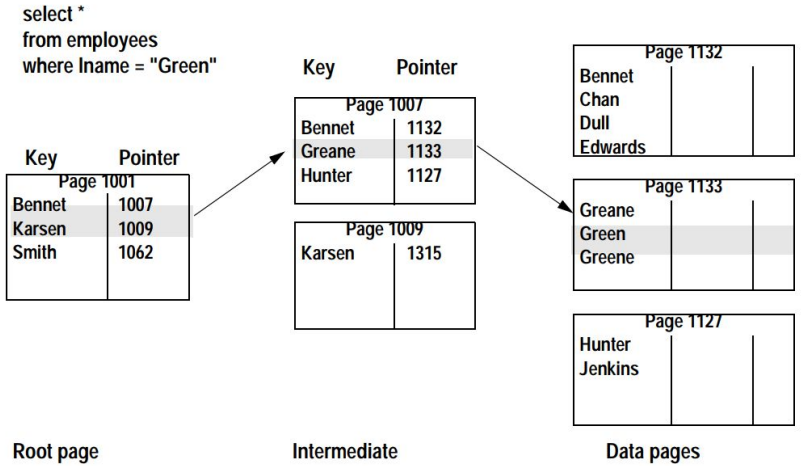


Figure 4:Selecting a row using a clustered index, APL table.[5]

[5] Adaptive Server Enterprise. Performance and Tuning: Basics. Retrieved from http://infocenter.sybase.com/help/topic/com.sybase.dc20020_1251/pdf/databases.pdf. p 277

Partitioning

SAP ASE supports:

- **Range Partitioning**
  Rows are distributed among partitions according to values in the partitioning key columns.
- **Hash Partitioning**
  ASE uses a hash function to specify the partition assignment for each row.
- **List Partitioning**
  Rows are distributed semantically; that is, according to the actual value in the partitioning key column.
- **Round-Robin Partitioning(Default)**
  SAP ASE assigns rows in a round-robin manner to each partition so that each partition contains a more or less equal number of rows and load balancing is achieved.

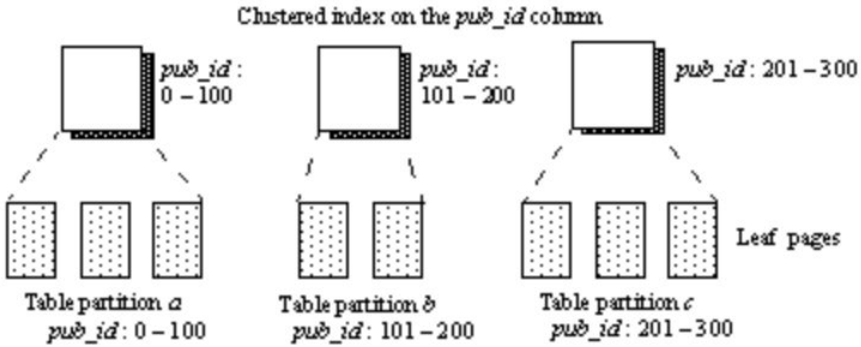


Figure 5: Range-partitioned table example.[6]

[6] Adaptive Server Enterprise. Performance and Tuning: Basics.
Retrieved from http://infocenter.sybase.com/help/index.jsp?topic=/com.sybase.infocenter.dc32300.1600/doc/html/san1390612300205.html

References

- rocket99.com. *Sybase : Sybase ASE Overview, Architecture*, www.rocket99.com/techref/8681.html.
- rocket99.com. *Sybase versus Oracle*, www.rocket99.com/sybase/syb_vs_ora.html.
- “SAP Adaptive Server Enterprise 16.0.” *Sybase Online*, 29 Sept. 2014, infocenter.sybase.com/help/index.jsp?topic=/com.sybase.infocenter.help.ase.16.0/doc/html/title.html.
- *SyBooks Online (Archive)*, infocenter-archive.sybase.com/help/index.jsp?topic=%2Fcom.sybase.help.ase_12.5%2Ftitle.htm.
- *SAP Help Portal*, help.sap.com/viewer/38af74a09e48457ab699e83f6dfb051a/16.0.3.7/en-US.
- *SAP Help Portal*, help.sap.com/viewer/9623e59098a24dc6b9013ba5d709309e/16.0.3.7/en-US.
- “Sybase.” *Wikipedia*, Wikimedia Foundation, 12 Dec. 2020, en.wikipedia.org/wiki/Sybase.
- Talebzadeh, Mich. “Oracle and Sybase, Concepts and Contrasts Part 1.” *Understanding the Sybase Data Server Architecture*, Jan.2006, www.peridale.co.uk/oracle_and_sybase_article.pdf.
- Talebzadeh, Mich. “Sybase ASE: Performance Benefits of DPL and DRL.” *SearchDataCenter*, TechTarget, 11 Oct. 2006, searchdatacenter.techtarget.com/tip/Sybase-ASE-Performance-benefits-of-DPL-and-DRL.