NEON
Enterprise Software, Inc.

Database Archiving

Managing Data for Long Term Retention

Craig S. Mullins
craig.mullins@neonesoft.com

Authors

This presentation was prepared by:

Craig S. Mullins
Corporate Technologist

NEON Enterprise Software, Inc.
14100 Southwest Freeway
Sugar Land, TX 77479
Tel: 888.338.6366
Fax: 281.207.4973
E-mail: craig.mullins@neonesoft.com

Agenda

NEON Enterprise Software, Inc.

Emergence of Data Management Functions

The Long Term Data Storage Problem

Long Term Data Storage Solutions

Database Archiving Capabilities

Difference between DBA and DM

NEON
Enterprise Software, Inc.

- Database Administration
  - Backup/Recovery
  - Disaster Recovery
  - Reorganization
  - Performance Monitoring
  - Application Call Level Tuning
  - Data Structure Tuning
  - Capacity Planning

Managing the database environment

- Data Management
  - Database Security
  - Data Privacy Protection
  - Data Quality Improvement
  - Data Quality Monitoring
  - Database Archiving
  - Data Extraction
  - Metadata Management

Managing the content and uses of data

Data Management Functions

NEON Enterprise Software, Inc.

- **Database Security**
  - Authorization Auditing
  - Access Auditing
  - Intrusion Detection
  - Replication Auditing
- **Data Quality**
  - Data Profiling
  - Data Quality Assessment
  - Data Cleansing
  - Data Quality Filtering
  - Data Profile Monitoring
- **Data Archiving**
  - Short term Reference Database
  - Long Term Database Archiving
- **Data Extraction**
  - Maintain privacy
  - Maintain Security
- **Metadata Management**
  - Complete Encapsulation
  - Change History Auditing

Database Administration Functions

NEON
Enterprise Software, Inc.

- Very well defined tasks
- Very well defined Job Title and Description
- Overwhelming vendor support
- DBMS architectures fully supportive
- Functions fall entirely in IT
- Must be done well to support efficient operational environment

Data Management Functions

NEON Enterprise Software, Inc.

- Tasks definitions are emerging
- No standard Job Titles or Descriptions
- More aligned with business units than IT
- IT management has not been supportive (NMP)
- Executive management has not been supportive
- DBMS architectures built without consideration of DM
- Little Vendor Support
- Companies have accrued many penalties for not paying attention to DM requirements

Emerging Data Management Drivers

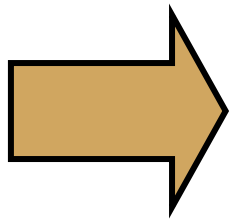
NEON Enterprise Software, Inc.

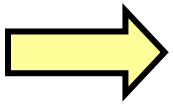
Recent Regulations:
- Corporate Governance
- Data Privacy
- Data Retention
- Data Accuracy

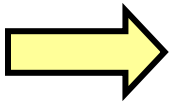
Increasing Data Quality Costs

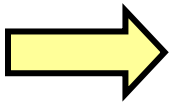
Increasing Data Volumes

Increasing uses/ users of data

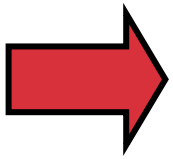








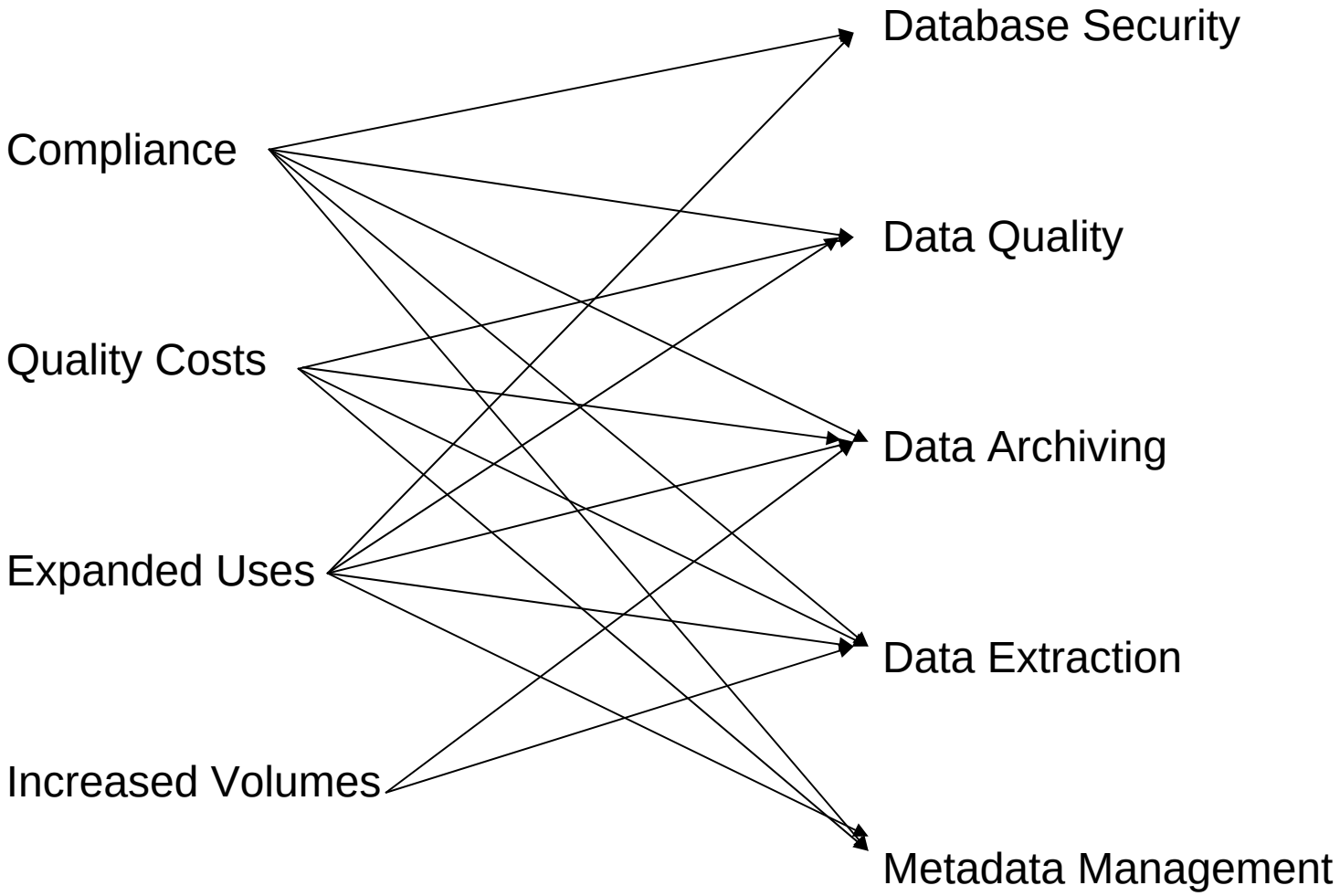
More Emphasis and Spending on Data Management Functions



Significant Tangible Benefits

Drivers Impacts on Functions

NEON Enterprise Software, Inc.

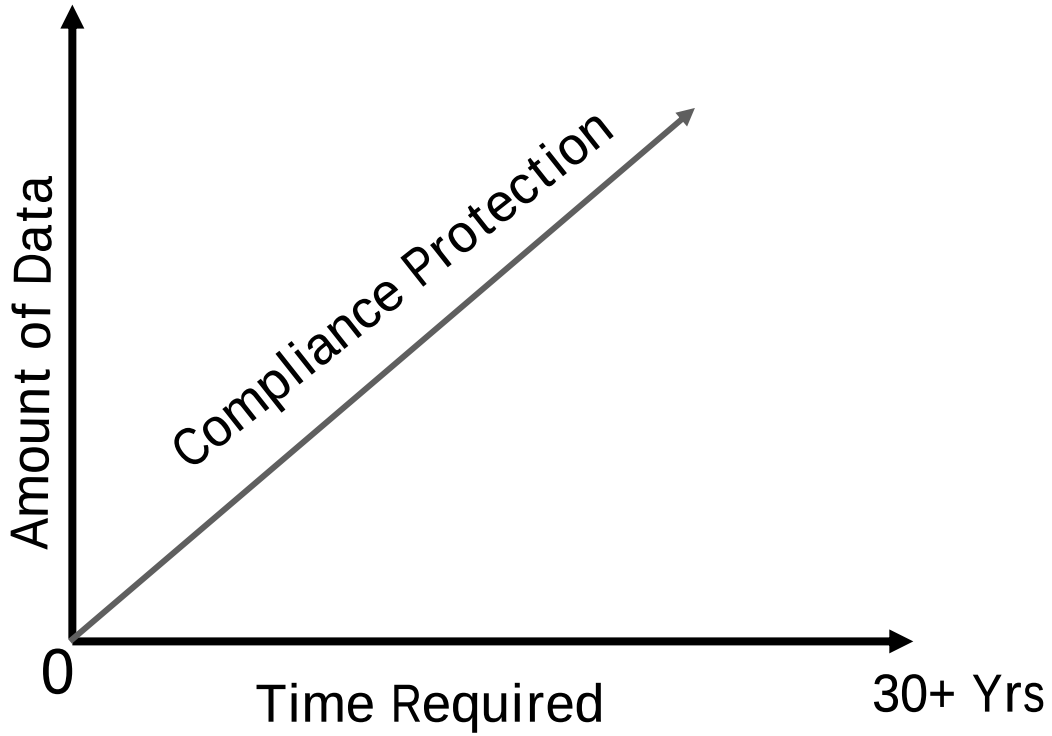


NEON
Enterprise Software, Inc.

Long Term Database Archiving

Trends Impacting Archive Needs

NEON Enterprise Software, Inc.

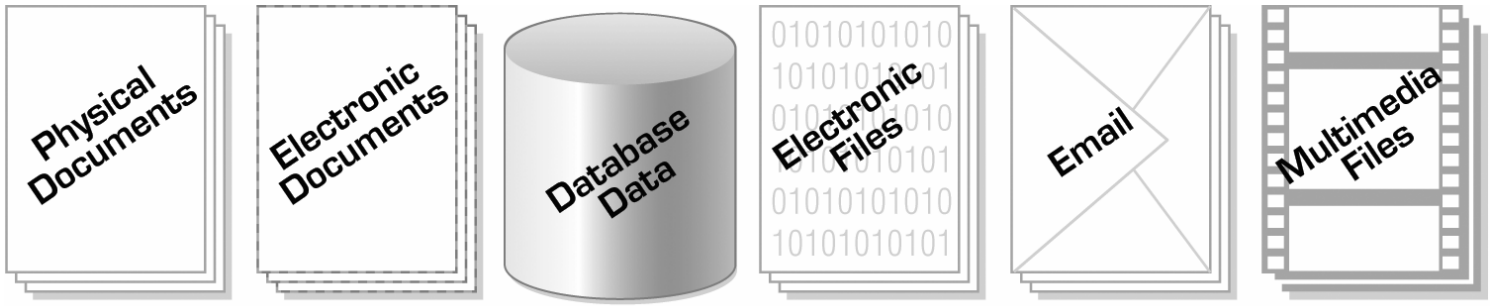


Data Retention Issues:

- Volume of data
- Length of retention requirement
- Varied types of data
- Security issues

Archiving All Types of Data

NEON Enterprise Software, Inc.



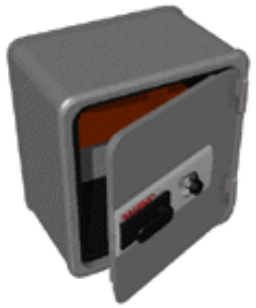
Paper	Word	IMS	VSAM	Outlook	Sound
Blueprints	Excel	DB2	Programs	Lotus Notes	Pictures
Forms	PDF	ORACLE	UNIX Files	Attachments	Video
Claims	XML	SYBASE			
		SQL Server			
		IDMS			

Database Archiving

NEON Enterprise Software, Inc.

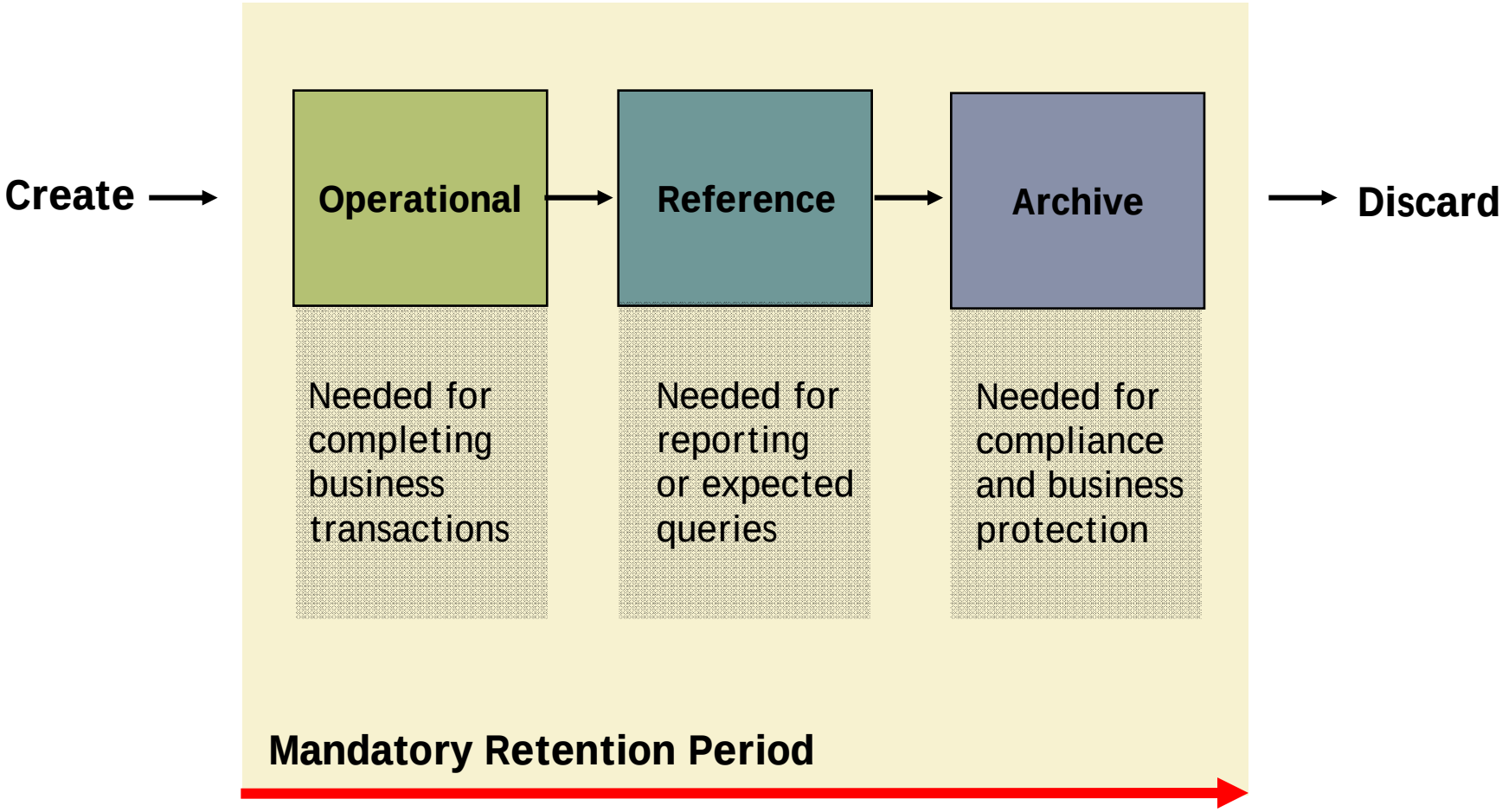
Database Archiving:
The process of removing selected data records from operational databases that are not expected to be referenced again and storing them in an archive data store where they can be retrieved if needed.

~~Purge~~



Data Archive and ILM

NEON Enterprise Software, Inc.

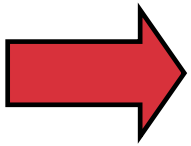


Data Retention: Database Archiving

NEON Enterprise Software, Inc.

Data Retention Requirements refer to the length of time you need to keep data

Determined by laws: external regulations
Determined by business needs: internal needs for analytic applications



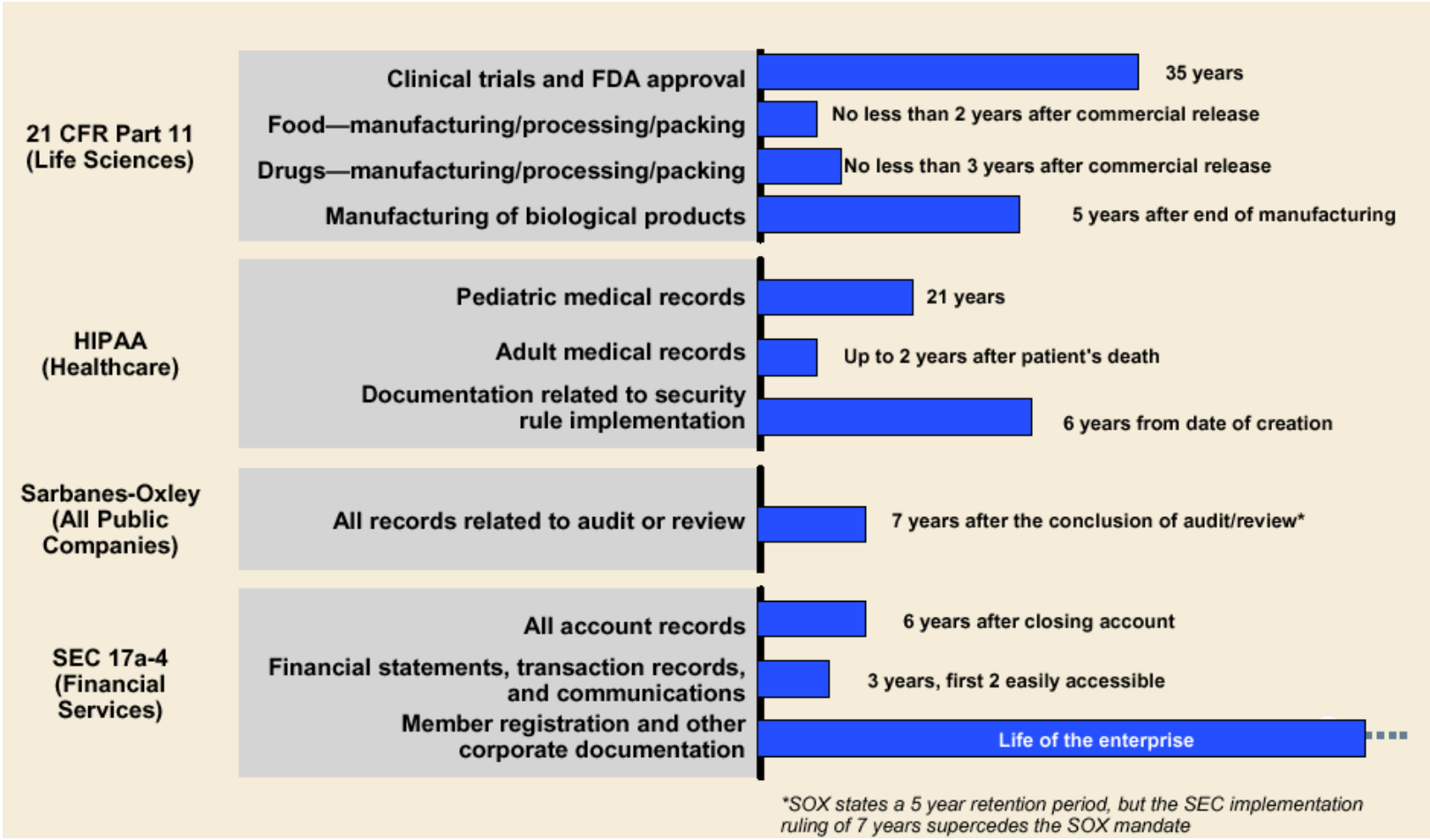
We need to keep more data: a **lot** more data (125% CAGR)
For more years: a **lot** more years
We need to preserve original content and meaning

Old retention period

New retention period

Some Sample Regulations Impacting Data Retention

NEON Enterprise Software, Inc.



E-Discovery

NEON Enterprise Software, Inc.

Electronic evidence is the predominant form of discovery today.
(Gartner, Research Note G00136366)

Electronic evidence could encompass anything that is stored anywhere.
(Gartner, Research Note G00133224)

When data is being collected (for e-discovery) it is imperative that it is not changed in any way. Metadata must be preserved…
(Gartner, Research Note G00133224)

Gartner Strategic Planning Assumption

- **Through 2007, more than half of IT organizations and in-house legal departments will lack the people and the appropriate skills to handle electronic discovery requirements (0.8 probability).**
  (Gartner,Research Note G00131014)

E-Discovery

NEON Enterprise Software, Inc.

Federal Rules of Civil Procedure, Rule 34b

- *Took effect December 2006*
- A party who produces documents for inspection shall produce them . . . as they are kept in the usual course of business..."
- The amended rules state that requested information must be turned over within 120 days after a complaint has been served.

So data stored in database systems must be able to be produced in electronic form.

What Does It All Mean?

NEON Enterprise Software, Inc.

Enterprises must recognize that there is a business value in organizing their information and data.

Organizations that fail to respond run the risk of seeing more of their cases decided on questions of process rather than merit.

(Gartner, 20-April-2007, Research Note G00148170: Cost of E-Discovery Threatens to Skew Justice System)

Operational Efficiency

NEON Enterprise Software, Inc.

Database Archiving can also be undertaken to improve operational efficiency

- **Large volumes of data can interfere with production operations**
  - **efficiency of transactions**
  - **efficiency of utilities: COPY, REORG, etc.**
  - **Storage**
    - » **Gartner: databases copied an average of 6 times!**

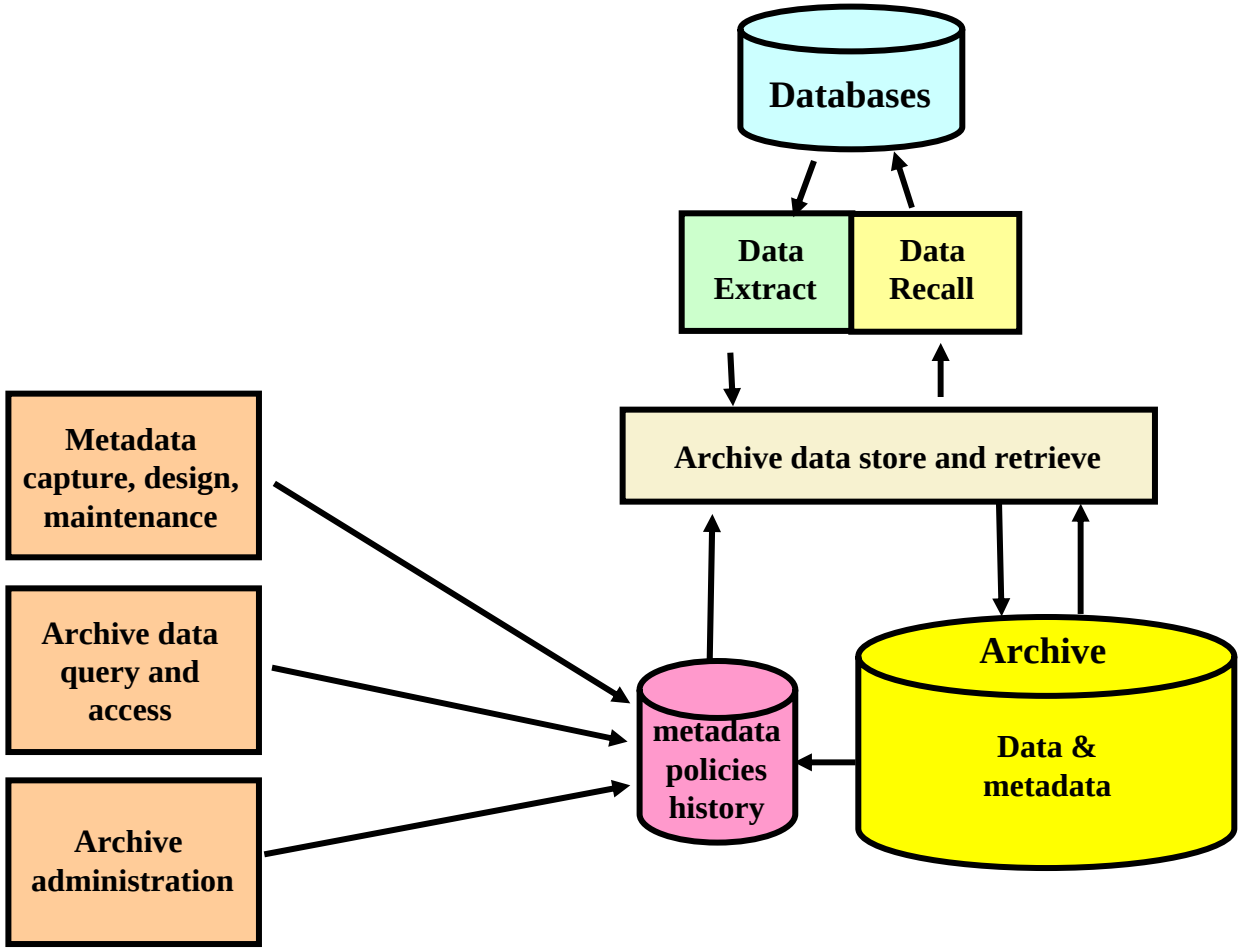
What Solutions Are Out There?

NEON Enterprise Software, Inc.

- **Keep Data in Operational Database**
  - Problems with authenticity of large amounts of data over long retention times
- **Store Data in UNLOAD files** *(or backups)*
  - Problems with schema change and reading archived data; using backups poses even more serious problems
- **Move Data to a Parallel Reference Database**
  - Combines problems of the previous two
- **Move Data to a Database Archive** 

Components of a Database Archiving Solution

NEON Enterprise Software, Inc.



What Do You Need to Support Database Archiving?

NEON Enterprise Software, Inc.

- Policy based archiving: logical selection
- Keep data for very long periods of time
- Store very large amounts of data in archive
- Maintain Archives for ever changing operational systems
- Become independent from Applications/DBMS/Systems
- Become independent from Operational Metadata
- Protect authenticity of data
- Access data when needed; as needed
- Discard data after retention period

Policy based archiving

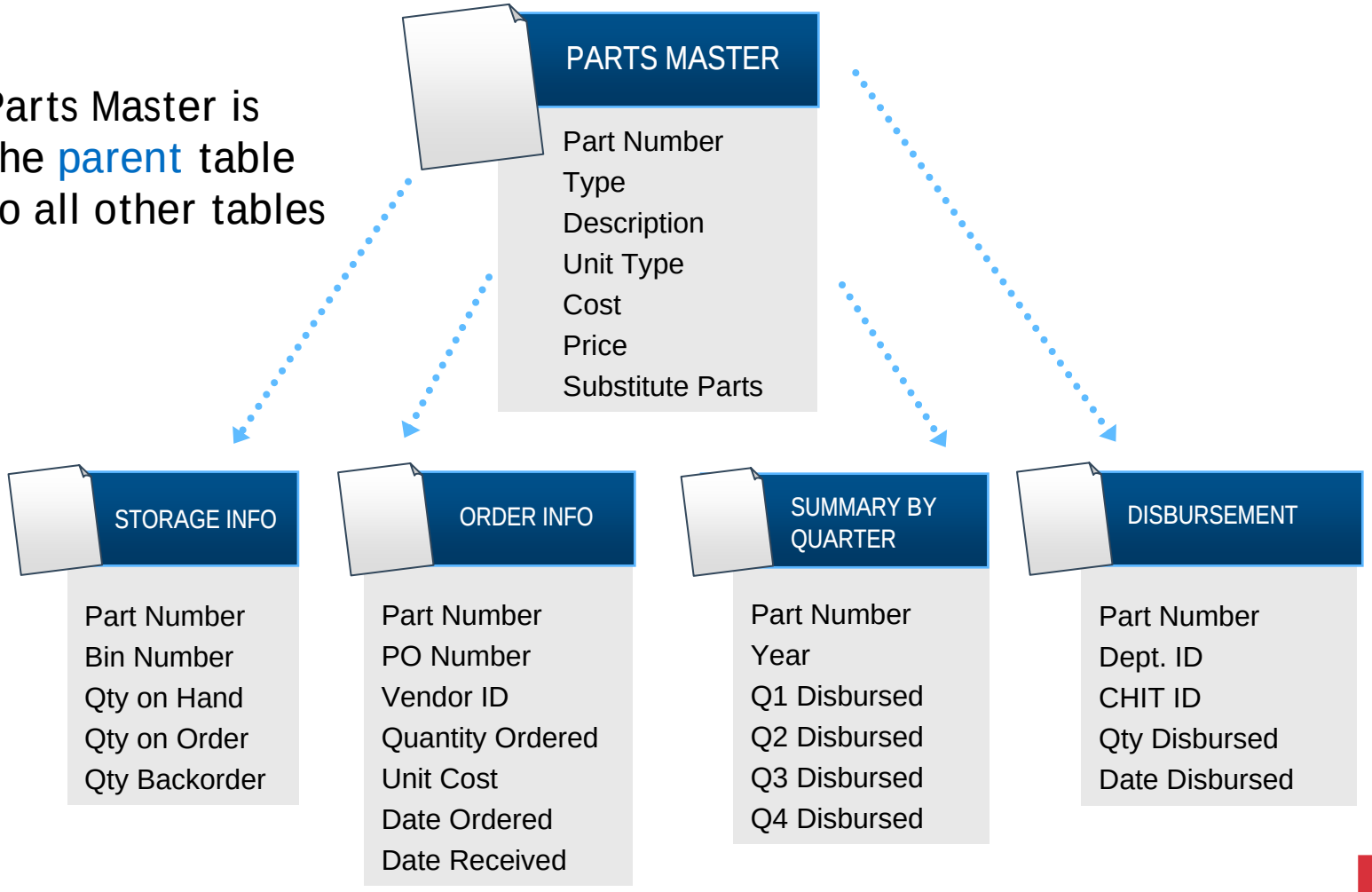
NEON Enterprise Software, Inc.

- **Why :**
  - Business objects are archived, not files
  - Rules for when something is ready can be complex
  - Data ready to be archived is distributed over database
- **Implications:**
  - User must provide policies for when something is moved
- **How:**
  - Full metadata description of data
  - Flexible specification of policy : “WHERE clause”
  - Support accessing data outside archive set

For Example...

NEON Enterprise Software, Inc.

Parts Master is the parent table to all other tables



Keep Data for a Long Time

NEON Enterprise Software, Inc.

- Why: retention requirements in decades
- Implications:
  - Archive will outlive applications/DBMS/systems that generated them
  - Archive will outlive people who designed and managed operational systems
  - Archive will outlive media we store it on
- How:
  - Unique data store
  - Application/DBMS/system independence
  - Metadata independence
  - Continuous management of storage
  - Continuous management of archive content

Keep Very Large Amounts of Data

NEON Enterprise Software, Inc.

- **Why :**
  - Large volumes of data today
  - Increasing rates of data volume growth
  - Long retention periods
- **Implications:**
  - Archive won't fit in DBMS solutions
  - Must partition contents
  - Cannot read all of archive to satisfy queries
  - Must support management functions at partition level
- **How:**
  - Unique data store
    - Supports partitioning of data
    - Unlimited number of partitions
    - Manages partitions independently
  - Indexing and scoping

Maintain Archive for Changing Operational Systems

NEON Enterprise Software, Inc.

- **Why :**
  - Metadata changes frequently
  - Applications are re-engineered periodically
    - Change DBMS platform
    - Change System platform
    - Replace with new application
    - Consolidate after M&A
- **Implications:**
  - Archive must support multiple variations of an application
  - Archive must deal with metadata changes
- **How:**
  - Manage applications as major archive streams having multiple minor streams with metadata differences
  - Achieve independence from operating environment

Achieve Application Independence

NEON Enterprise Software, Inc.

- **Why:**
  - Operational applications will not be available
  - Operational systems will not be available
- **Implications:**
  - Archive must satisfy all query requirements from within
  - Archive data must include metadata needed for interpretation of data
  - Archive system will be moved to new systems from time to time
- **How:**
  - Store metadata and data in archive together
  - Implement archive system on multiple systems
  - Implement archive system on new systems

Achieve Metadata Independence

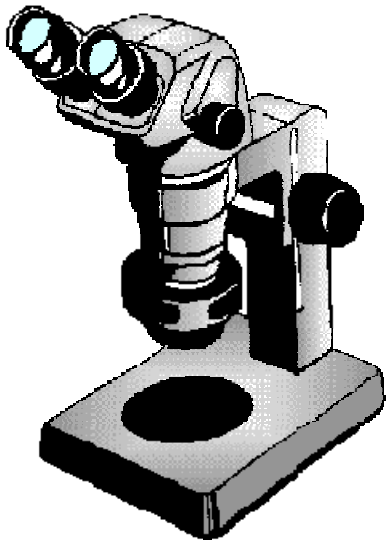
NEON Enterprise Software, Inc.

- **Why :**
  - Operational metadata is inadequate
  - Operational metadata changes
  - Operational systems keep only the “current” metadata
  - Data in archive often does not mirror data in operational structures
- **Implications:**
  - Archive must encapsulate metadata
  - Metadata must be improved
- **How:**
  - Metadata Capture, Validate, Enhance capabilities
  - Store structure that encapsulates with data
  - Keeps multiple versions of metadata

Protect Authenticity of Data

NEON Enterprise Software, Inc.

- Why :
  - Potential use in lawsuits/ investigations
  - Potential use in business analysis
- Implications:
  - Protect from unwanted changes
  - Show original input
  - Cannot be managed in operational environment
- How:
  - SQL Access that does not support I/U/D
  - Do not modify archive data on metadata changes
  - Encryption as stored
  - Checksum for detection of sabotage
  - Limit access to functions
  - Audit use of functions
  - Maintain offsite backup copies for restore if sabotaged



Access Data Directly From Archive

NEON Enterprise Software, Inc.

- **Why :**
  - Cannot depend on application environment
- **Implications:**
  - Full access capability within archive system
- **How:**
  - Industry standard interface (e.g. JDBC)
  - LOAD format output for
    - For load into a database
    - May be different from database came from
  - Recall format output for
    - Showing original input bit-for-bit
  - Requires full and accurate metadata
  - Ability to review metadata
  - Ability to function across metadata changes

Discard Function

NEON Enterprise Software, Inc.

- **Why :**
  - Legal exposure for data kept too long
- **Implications:**
  - Data cannot be kept in archive beyond retention period
  - Must be removed with no exposure to forensic software
- **How:**
  - Policy based discard
  - System level function
  - Tightly controlled and audited
  - True “zero out” capability
  - Discard from backups as well

So Where do we store the archive?

NEON
Enterprise Software, Inc.

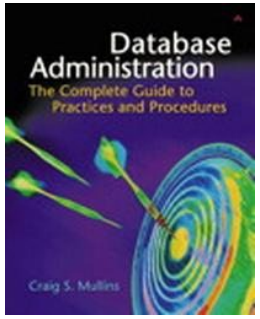
- **NOT a Relational Database!**
  - Only supports 1 definition of data
  - Problem with very large amounts of data
  - Cannot protect from unwanted changes
  - Requires excessive administration
- **New Database Archive Structure**
  - Stores data and metadata
  - Partitions data by metadata groupings
  - Unlimited number of partitions
  - Does not support INSERT/UPDATE/DELETE functions
  - Manages by partitions
  - Indexed and scoped

Summary Points

NEON Enterprise Software, Inc.

- Keeping data in operational systems is a bad idea
- Putting data in UNLOAD files is a bad idea
- Putting data in a parallel references database is a bad idea
- Using a DBMS to store the archive does not work
- Database archiving requires a great deal of data design
  - Establishing and maintaining metadata
  - Designing how data looks in the archive
  - Achieving application independence
- Database archives must be continuously managed
  - Copying data for storage problems (e.g. media rot)
  - Copying data for system changes
  - Copying data for data encoding standard changes
  - Logging, auditing, and monitoring
    - Archive events
    - Partition management
    - Accesses
- Must staff-up for database archival

NEON
Enterprise Software, Inc.



Craig S. Mullins

NEON Enterprise Software

craig.mullins@neonesoft.com

www.neonesoft.com

www.craigsmullins.com

www.DB2portal.com

My Blogs: http://www.craigsmullins.com/blogs.htm

My Books: http://www.craigsmullins.com/booklnks.htm

Intelligent Solutions for Enterprise Data. Depend On It.

http://www.neonesoft.com