IBM Software Group

DB2 Universal Database Version 8

Mehr Daten…Einfacher verwalten

DB2 Data Management Software

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EMEA Region Central
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e business software

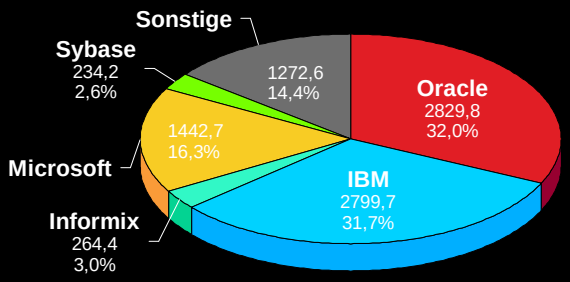
| Date 3.4.03 |

DB2 Version 8
Führende Technologie für Informations-Management und -Integration

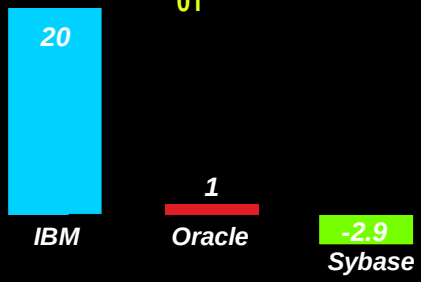
- DB2 Strategie
- DB2 Version 8: Überblick und Neuheiten

IBM führt

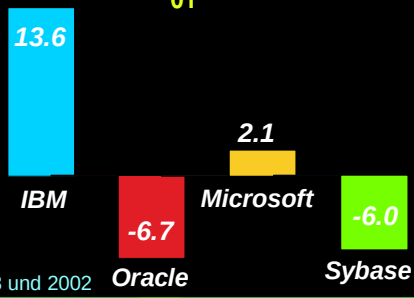
2001 WW Datenbanken Marktanteile*



UNIX Marktanteilswachstum '97-01**



Windows Marktanteilswachstum '97-01**

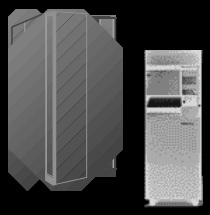


- Weltweiter Datenbank Markt 2001
  - 8.844 Mio. US$, 1.4% Wachstum
  - IBM Wachstum: 4.3%
- Kundenzufriedenheit fördert Wachstum
  - Führende Technologie, Cross Plattform
  - Starke Partnerschaften
  - Günstige TCO

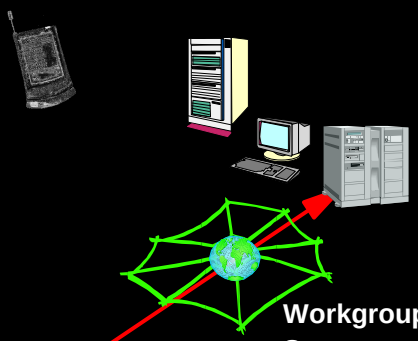
* Quelle: Dataquest, Mai 2002
** Quelle: Basierend auf Dataquest 1998 und 2002

IBM DB2 Familie

Enterprise Servers
- DB2 UDB for OS/390 and z/OS
- DB2 for VM and VSE
- DB2 UDB for OS/400
- DB2 UDB for zLinux



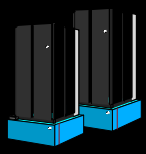
Everyplace
- PalmOS
- Win CE
- EPOC-32
- Linux
- Win32



DB2 Connect

Enterprise Server Edition
- Windows
- AIX
- HP-UX
- Solaris
- Linux(Intel)

with Clustering-Partioning Option



Workgroup Server Edition
- Windows
- Linux(Intel)
- AIX
- Solaris
- HP-UX

Personal Edition
- Windows
- Linux(Intel)

DB2 UDB V8 Packaging/Platforms

- Platform Support
  - Stabilizing OS/2 and NUMA-Q/PTX at Version 7.2
    - NUMA-Q hardware strategy is to support Windows
  - Tier 1 Platforms
    - AIX
    - Solaris
    - HP-UX
    - Windows
    - Linux xSeries (Intel)
    - Linux zSeries (Linux/390)
  - Statement of Direction
    - Linux iSeries (AS/400)
    - Linux pSeries (RS/6000)
- Satellite Edition Merges with Personal Edition / Workgroup
- DB2 Workgroup Edition now called DB2 Workgroup Server Edition
- DB2 EE merges with DB2 EEE
  - Enterprise Server Edition (ESE)
  - Clustering/Partitioning is an Option

DB2 Version 8 - Schwerpunkte

- **SMART Management**
  Konfiguration, Management, Tuning, Automatisierung...
- **Informations Integration**
  Federation
  Web Services, XML
  Replikation...

- **Entwickler Produktivität**
  Java, .NET
  Web Services, XML...
- **Robuste e-business Infrastruktur**
  Leistung, Skalierbarkeit, Plattformen, Verfügbarkeit...

438 neue Features und Funktionen

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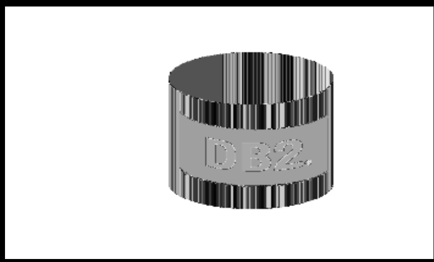

- **Entwickler Produktivität**
  Java, .NET
  Web Services, XML...
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  Leistung, Skalierbarkeit, Plattformen, Verfügbarkeit...

438 neue Features und Funktionen

DB2 V8 | Überblick |

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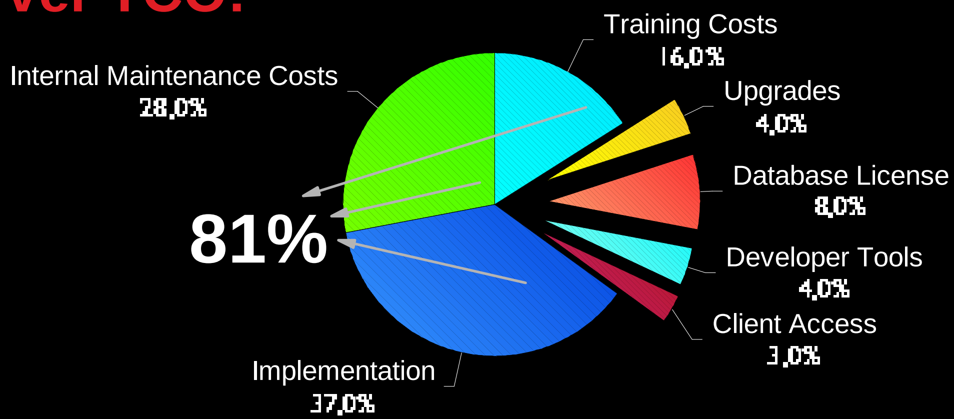
What's the Cost of Running a Database?

Server TCO:



Study of a competitive DBMS product, NOT DB2

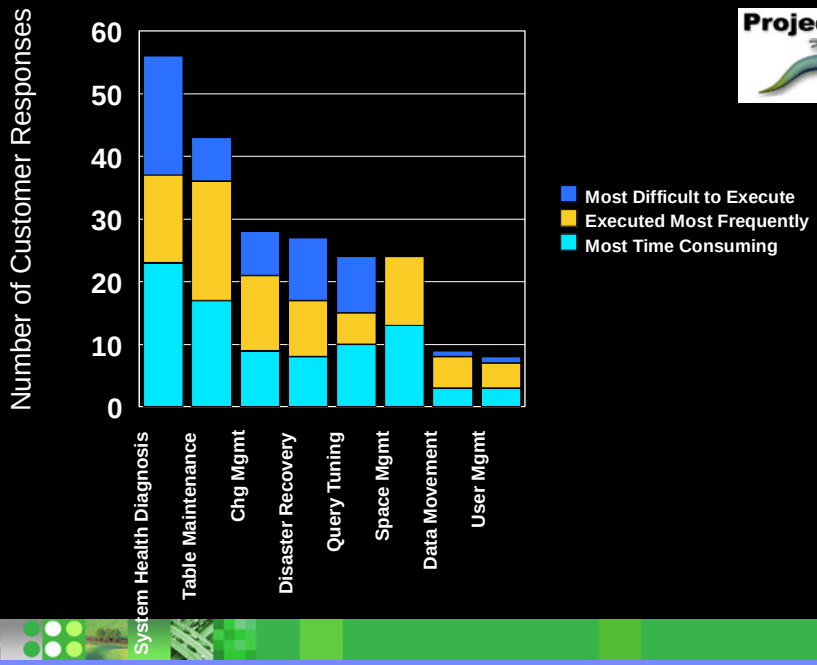
Source: The AberdeenGroup, 1998
[illegible]

DB2 V8 | Überblick |

A SMART DB2: What's our Focus?

Lots of stuff to do ... what shall we get started on?

Across the Industry, and DBMSes ...



SMART Management

- **Selbst Konfiguration**
  Automatisches Überwachen und Tunen von Ressourcen
- **Selbst Heilung**
  Entdeckung und Diagnose von und Reaktion auf Störungen
- **Selbst Optimierung**
  Automatische Anpassung an veränderliche Systemumgebung

Self Managing And Resource Tuning

- **DB2 V7 ist schon SMART...**
  - Query Optimizer, Query Rewrite
  - Automatische Parallelisierung
  - Control Center
  - Zahlreiche Wizards etc...

Mit weniger Skills und Ressourcen Systeme optimal ausnutzen

DB2 V8...noch SMARTer

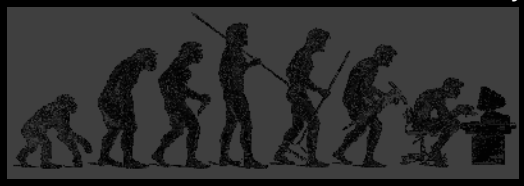
- **Configuration Advisor**
  - Vereinfacht das Tuning
  - Stellt dutzende von Parametern ein
  - Automatische HW Erkennung
- **Health Center und Monitor**
  - Überwacht & optimiert DB2
  - Automatische Regel-basierte Korrekturen oder Benachrichtigung
- **DB2 Tools**
  - DB2 Performance Expert
  - DB2 Recovery Manager
  - u.a.
- **und mehr...**

Project eLiza

Self Managing And Resource Tuning

The Steps to Autonomic Computing

- it's important to understand we're on an evolutionary path



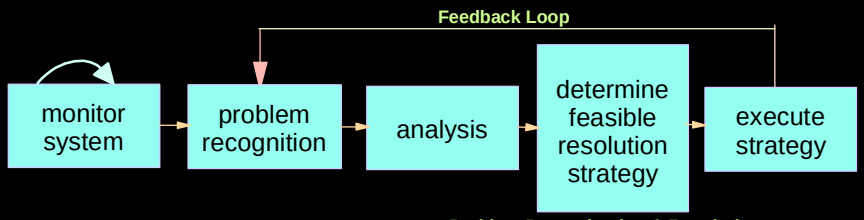
- we need to crawl before we walk, and walk before we run

- we need to gain your trust, and give you control when necessary

Control Center Enhancements

- Event Monitor GUI rewritten in Java
- Updated Panels
  - Script Center
  - Journal
- New panels
  - Replication center
  - Development center
- New Wizards
  - create tablespace wizard for EEE
  - summary table wizard
  - performance configuration wizard for EEE
- Memory Visualizer
  - gain insight into memory usage within DB2
- Web-based Administration
  - maintain DB2 from an HTML session

Health Monitoring: Automating PD&R



Health & Welfare

what to monitor?
how to achieve low overhead monitoring?
how do I know there's a problem?

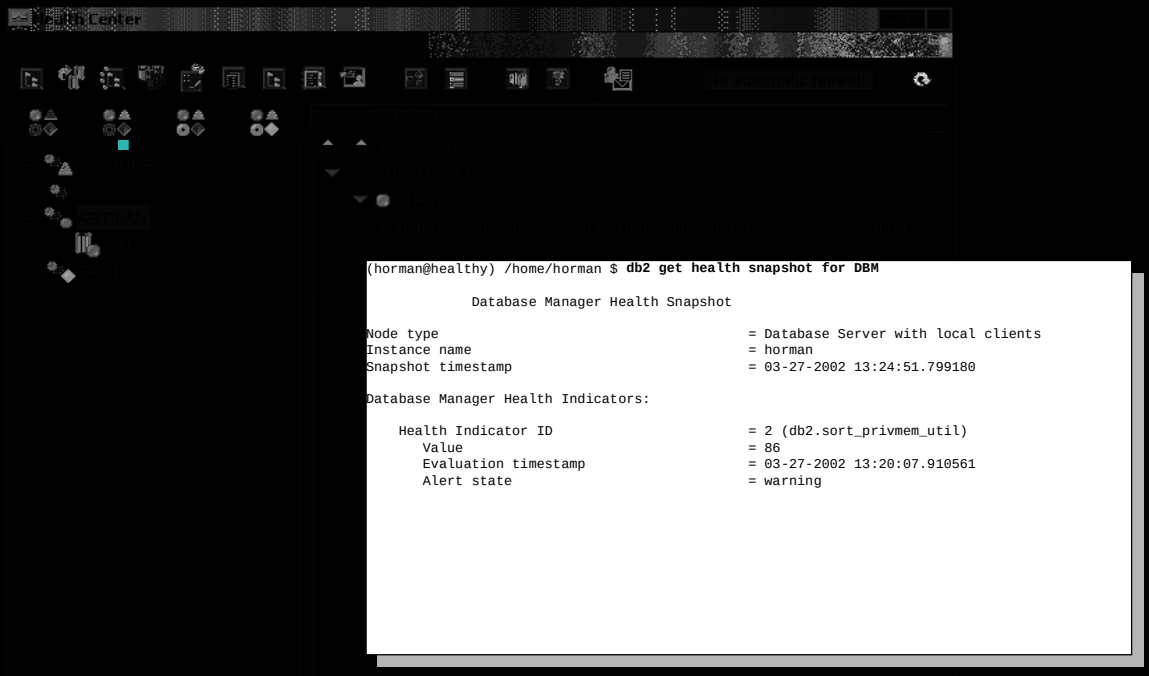
Problem Determination & Resolution

how and why did this happen?
what are the implications of encountering this problem?
does this affect anything else or is it isolated?
how do I fix it, and what is the "best" fix
when do I fix it?

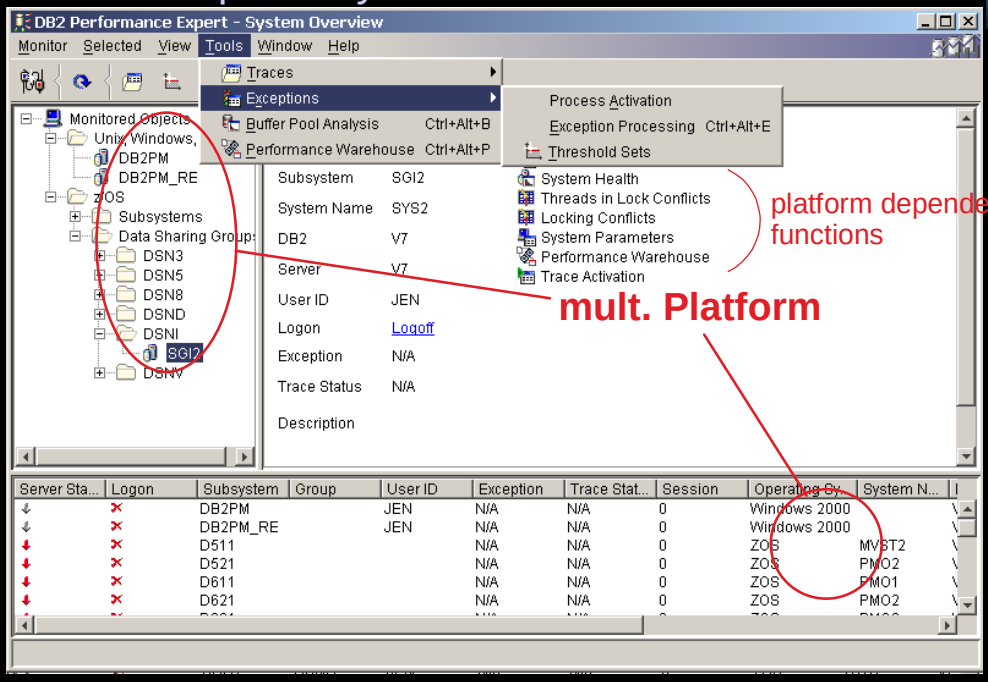
Automatic — Manual or Automatic

- automatically, cheaply monitor health w/o setup/configuration
- allow for automatic resolution of unhealthiness
- **Caveat:** not all resolutions can be automated!
  - require manual intervention (hard limit like disk full)
  - too complicated (many interrelations, interactions)
  - too risky

Health Center



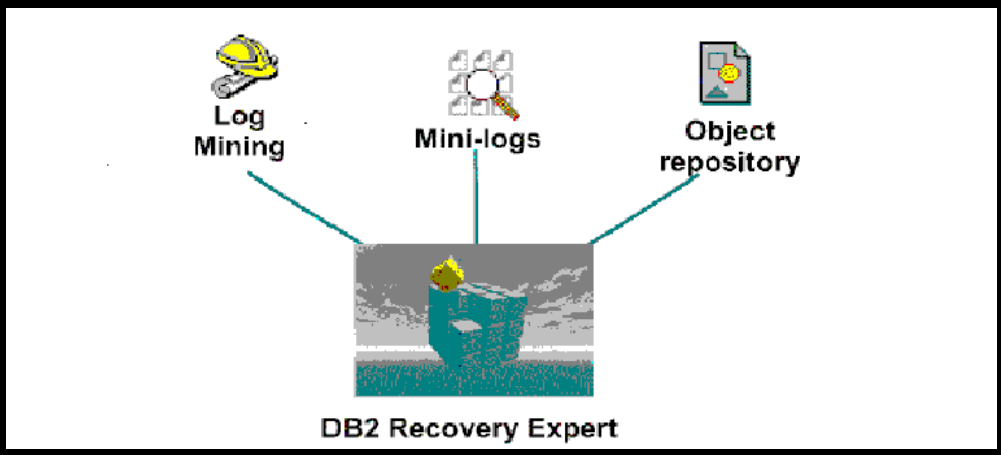
Performance Expert - System Overview



platform dependent functions

mult. Platform

Recovery Expert - Overview



High Performance Unload - transformations

database_name
table_name

file.out1

Source can also be:

- **Tablespaces**
  - All or selected partitions
  - Tables
    - Individual
    - Multiple tables
    - Summary tables
    - Alias tables
- **Backups**
  - Full image copy

DEL IXF ASC

named_pipe

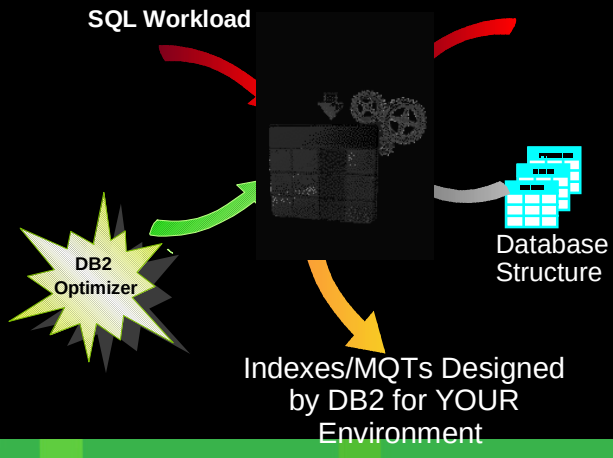
tape

SMART Management

- Platform specific exploitation
  - Automatic Configuration of Client Support
  - Dynamic memory utilization
  - Automatic statistic collection
  - much, much more

PLUS

- Comprehensive Tools
  - Traditional DBA Tools
  - Performance Config. Wizards
  - Index Advisor
  - Materialized Query Tables Advisor
  - much, much more



Online configuration parameters: BASIC

- **Overview**
  - Configuration parameter changes will be effective without stopping the instance or database.
    - Key configuration parameters can be set *online*.
      Focus was on the ones that customers change most often.
    - Several can now be made *automatic*. DB2 manages their value.
      For example, MAXAPPLS. Set it to automatic, and there is no limit to the number of applications.
- **How to enable**
  - CLP, Control Center or C API
  - When do they take effect?
    - IMMEDIATE (default)
      Must be explicitly attached to the instance, or connected to the database.
      - The Control Center will automatically form a attachment or a connection if you select the immediate option.
    - DEFERRED
      At next db2start or database activation as in prior versions.
- **Reference**
  - Admin guide: Performance

Online changes : USAGE TIPS

- Usage tips:
  - Changes in DBM configuration for clients only take effect during client code initialization.
  - Some configuration changes may take a noticeable amount of time to take effect due to overhead in allocating space.
  - The optimizer is sensitive to sort heap, bufferpool , etc.
    - Static SQL
      Rebind packages.
    - Dynamic SQL
      Access plans are cached.
      The FLUSH PACKAGE CACHE command invalidates the plans in the cache. They are compiled next time they are used.
  - 32 bit versus 64 bit.
    - 32 bit systems have a fixed shared memory. Online changes cannot exceed this, but can reallocate within it.
    - On 64 bit systems the shared memory can be changed dynamically. Online changes can take advantage of this.

Automatically-Tuned Configuration Parameters

- New SHOW DETAILS option of GET DB/DBM CONFIG
  - DB example:

```
Database Configuration for Database Auto
Description                                  Parameter   Current Value    Delayed Value
 ---------------------------------------------------------------------------------------
 Database configuration release level                    = 0x0a00
 Database release level                                  = 0x0a00

 Size of database shared memory (4KB)  (DATABASE_MEMORY) = AUTOMATIC(8416)  AUTOMATIC(8416)
 Catalog cache size (4KB)              (CATALOGCACHE_SZ) = (MAXAPPLS*4)     (MAXAPPLS*4)
 Package cache size (4KB)                   (PCKCACHESZ) = (MAXAPPLS*8)     (MAXAPPLS*8)
 Max number of active applications            (MAXAPPLS) = AUTOMATIC(40)    AUTOMATIC(40)
```

Automatic Deadlock Identification

```
5) Deadlocked Connection ...
  Deadlock Id: 6
  Deadlock Node: 10
  Participant no.: 1
  Participant no. holding the lock: 2
  Deadlock detection time: 08-22-2000 16:45:56.251972
  Table of lock waited on      : STAFF
  Schema of lock waited on     : RIIHI
  Tablespace of lock waited on : USERSPACE1
  Type of lock: Row
  Mode of lock: X
  Mode application requested on lock: NS
  Node lock occurred on: 0
  Lock object name: 39
  Application Handle: 6
  Deadlocked Statement:
   Type      : Dynamic
   Operation: Close
   Section   : 201
   Creator   : NULLID
   Package   : SQLC2D01
   Cursor    : SQLCUR201
   Cursor was blocking: FALSE
   Text      : select name from staff
```

- convenient to have deadlock info captured automatically

```
List Of Locks:
 Lock Object Name            = 3
  Node number lock is held at = 0
  Object Type                 = Table
  Tablespace Name             = USERSPACE1
  Table Schema                = RIIHI
  Table Name                  = STAFF
  Mode                        = IS
  Status                      = Granted
  Lock Escalation             = NO
 Lock Object Name            = 13
  Node number lock is held at = 0
  Object Type                 = Row
  Tablespace Name             = USERSPACE1
  Table Schema                = RIIHI
  Table Name                  = DEPARTMENT
  Mode                        = X
  Status                      = Granted
  Lock Escalation             = NO
 Lock Object Name            = 4
  Node number lock is held at = 0
  Object Type                 = Table
  Tablespace Name             = USERSPACE1
  Table Schema                = RIIHI
  Table Name                  = DEPARTMENT
  Mode                        = IX
  Status                      = Granted
  Lock Escalation             = NO
```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SMART
Online

DB2 V8 | Überblick |
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Robuste e-business Infrastruktu

- **Utilities**
  - Dynamische Buffer Pool Korrekturen
  - Dynamische Tablespacekorrekturen
  - In-place Tabellen Reorg
  - Index Reorg
  - Load & AST Wartung
  - Runstats
  - Online Inspect

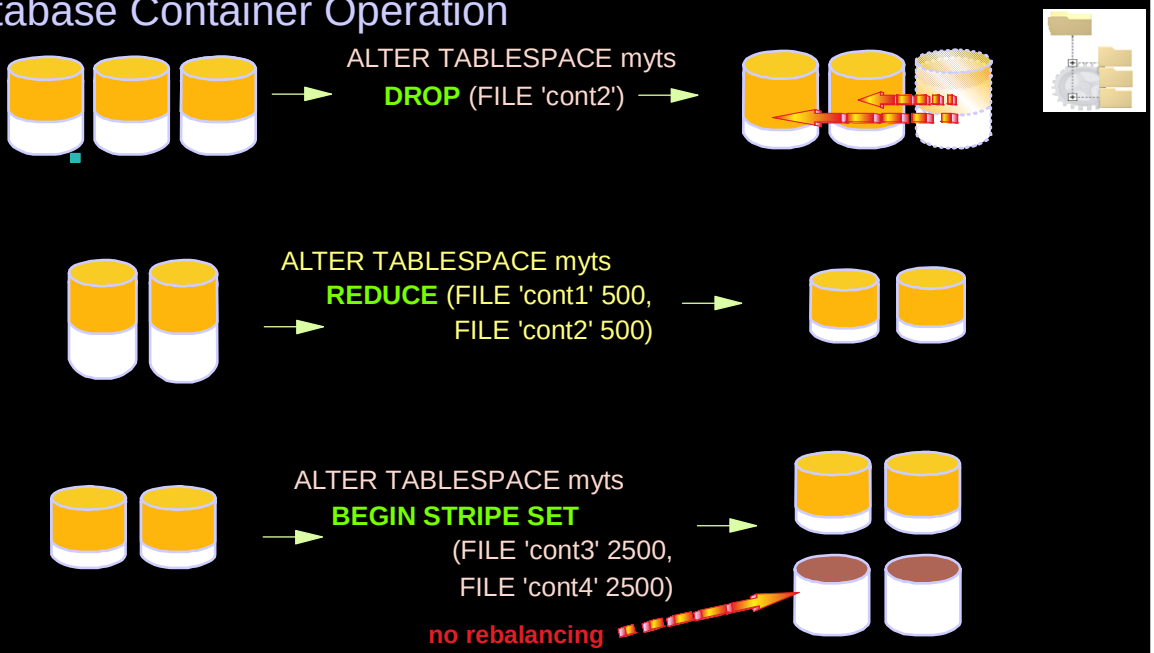
Online buffer pool changes

- Overview
  - Buffer pool changes will be possible while the database is active.
    - You can add a new buffer pool or resize an existing one.
  - This change, plus the ability to adjust database and instance configuration parameters online, allow you to change memory allocations while the system is active.
- How to use
  - CREATE and ALTER BUFFERPOOL SQL statement.
    - IMMEDIATE is the default.
    - DEFERRED option also available.
      Changes are effective at the next database activation.
  - DROP BUFFERPOOL
    - Buffer pool is dropped immediately as it is today.
    - However, memory will be immediately made available to the database shared memory.

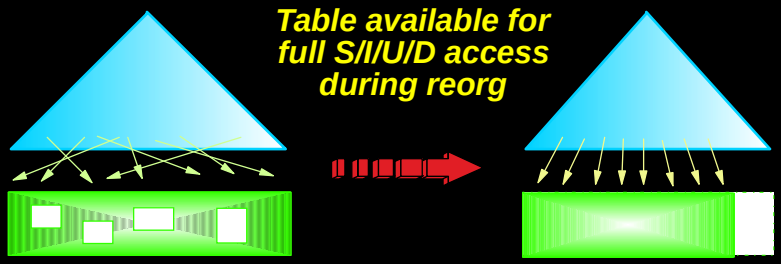
Online buffer pool changes : Sample scenario

- Exploitation examples
  - Customize memory usage to the task.
    - **Prime shift memory allocation is optimized for query performance (large buffer pool)**
    - **Use an off shift script that:**
      - ☑Reduces the buffer pool
      - ☑Increases utility heap and sort heap
      - ☑Run loads with the configuration optimized for load.
      - ☑Returns parameters to prime shift values

Database Container Operation

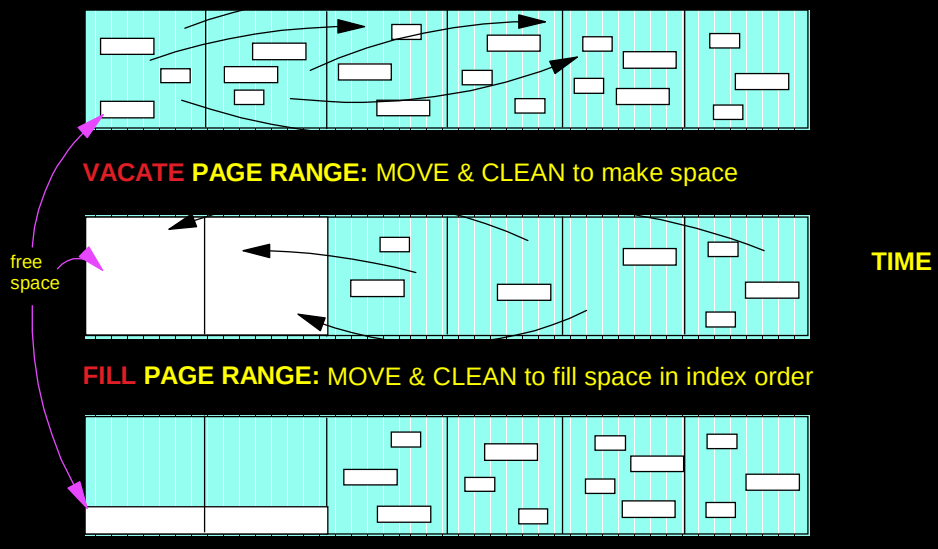


Online Table Reorganization

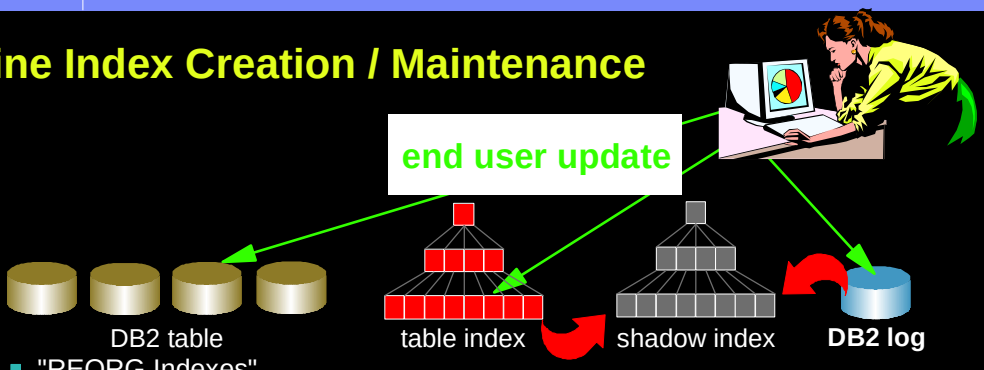


- **Inplace** Table Reorganization (Patent Pending)
  - Rows moved within existing table object to reestablish clustering, reclaim free space, and eliminate overflows (only moved rows are locked)
    - Can start, stop, resume, and pause
- Advantages over the Shadow Table Approach:
  - Minimal extra storage requirement (shadow table approach typically requires double the space)
  - Incremental: benefit of effects seen immediately (unlike shadow table approach where benefits only seen after completion)
  - No quiesce for 'switch over' at end

Online Table Reorganization

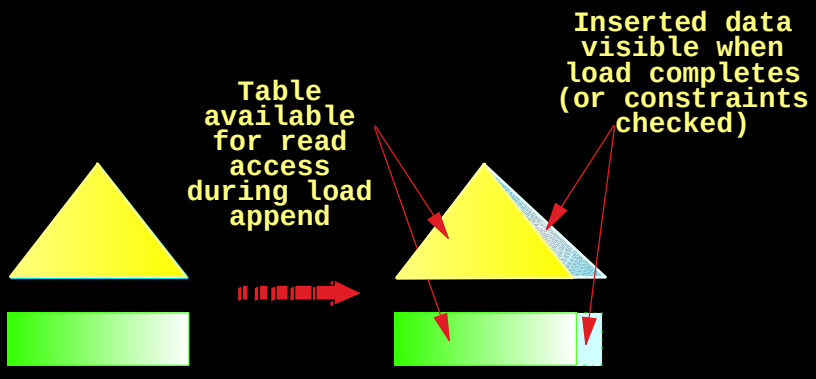


Online Index Creation / Maintenance



- "REORG Indexes"
  - *Shadow* index is created concurrent with normal database updates
  - When index creation is complete, old index is swapped out for the new
    - final synchronization via DB2 log file
  - Full read/write access to table & index during index reorganization
  - Temporary space required to build or reorganize the new index
- Benefits
  - Table is never "offline" from user or batch access
    - no more weekend reorgs to ensure end users always have access
  - Compacted index pages improves Performance

Online Table Load and Incremental AST Maintenance



- Tablespace available for full access
- Existing table/index data available for read access
- ASTs refreshed incrementally
  - Incremental maintenance of Immediate ASTs on Load APPEND
  - Deferred incremental AST (via staging table)

RUNSTATS Enhancements

- Enhanced features
  - Collect additional statistics, such as statistics on column combinations, and prefetching statistics on the table, index, and index-to-table relationship
  - Accept a list of index names
  - Accept a list of columns on which statistics are to be collected
  - Accept distribution statistics limits: NUM_FREQVALUES and NUM_QUANTILES values at the table level (without having to change the configuration parameters, and then disconnect and reconnect all users)
  - Accept individual column NUM_FREQVALUES and NUM_QUANTILES values
  - Perform a faster (sampled) collection of DETAILED index statistics

DB2 Version 8 - Schwerpunkte

- **SMART Management**
  Konfiguration, Management, Tuning, Automatisierung...
- **Informations Integration**
  Federation
  Web Services, XML
  Replikation...

- **Entwickler Produktivität**
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438 neue Features und Funktionen

Robuste e-business Infrastruktur

- **Installation**
- **DB2 Client**
  - Vollständig überarbeitet
  - Connection Concentrator
- **Multidimensionales Clustering**
  - Schnellere Abfragen
- **Automatic Summary Tables/Materialized Query Tables**
  - Nicht nur "Summaries" auch Joins...
  - Inkrementelles Update
- **Null & Default Komprimierung**
  - Minimiert Festplatten Bedarf

What's New in V8 Installation, Up and Running

- DAS (DB2 Administration Server) is no longer based on an instance (dasicrt, dasidrop or dasilist have been replaced with dascrt,dasdrop and daslist).
- Java based GUI install for all products/platforms
- Ability to uninstall individual products and components
- Improved ability to diagnose problems through improved tracing and additional logging
- Ability to save an install session in a response file

Unix Multiple FixPaks

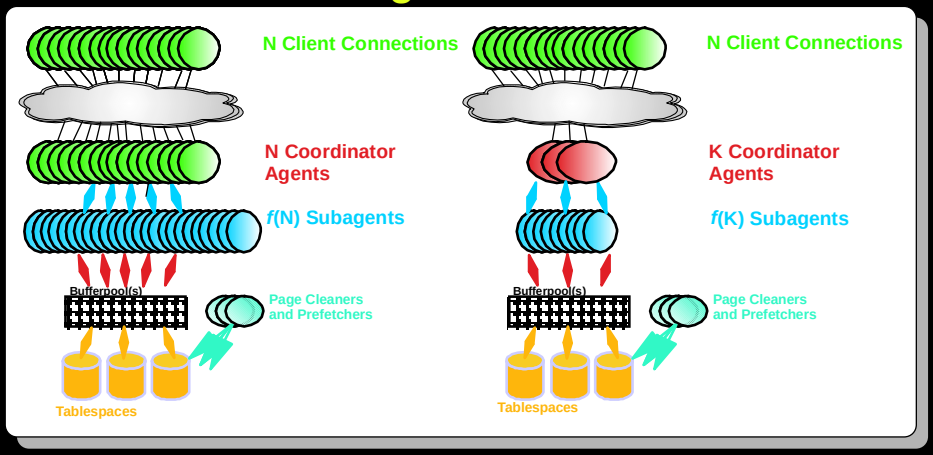
- Support Co-existence of DB2 GA and different FixPak levels on the same Unix workstation
  - For testing fixes before replacing in production DB2 code level
  - For supporting multiple development groups requiring different levels of DB2
- V8 Implementation
  - Can think of each as a "mini-release"
  - Two FixPaks will be created at FixPak release
  - They are identical in terms of contents and code level.
  - Regular FixPak - this is business as usual
  - Alternate FixPak
    - Full install image at FixPak code level (not a delta) - equivalent to GA plus regular FixPak (which is a delta)
    - Installs to a different path
    - Has different fileset/package name
    - Built-in rpath is modified so DB2 will find the right binaries

64-bit Support

- Full 64-bit database
  - Larger buffer pools, sort heap, other resources
  - AIX, Solaris, and HP-UX was supported as of Version 7.1

64-bit Product	AIX	SUN	HP	Linux (Intel)	Windows
Personal Edition	N/A	N/A	N/A	yes	yes
Workgroup Edition	no	no	no	no	no
EE / ESE	yes	yes	yes	yes	yes
Connect Enterprise	yes	yes	yes	yes	yes
App. Dev. Client	yes	yes	yes	yes	yes
Administration Client	yes	yes	yes	yes	yes
Runtime Client	yes	yes	yes	yes	yes
DB2/Informix Connectors	yes	yes	yes	yes	yes
Spatial Extender	yes	yes	yes	yes	yes

Client Unterstützung



- Connection Concentrator
  - N:M architecture is very efficient and supports 1000s of concurrent connections
  - Fast performance, less memory utilization, and total cost of ownership savings
  - Enable by setting MAX_CONNECTIONS > MAX_COORDAGENTS, e.g.:
    - UPDATE DBM CFG USING MAX_CONNECTIONS 5000 MAX_COORDAGENTS 500

Engine Enhancements

- Type 2 Indexes
  - prereq for online reorg
- Prefetching Enhancements
  - prefetching can exploit block based buffer pools
  - will use block I/O instead of prefetching pages
- NULL and Default value compression
  - reduce storage for typical data warehousing scenarios - sparse tables
  - increase performance of large scans

Maintenance Mode: QUIESCE

- QUIESCE allows administrators to force all users off the instance/database and put it into a quiesced mode.
  - SYSADM, SYSMAINT, and SYSCTRL will always have access to instance while it is quiesced
  - SYSADM and DBADM will always have access to database while it is quiesced.
- UNQUIESCE
- GRANT/REVOKE QUIESCE_CONNECT command
  - Only users with authority in this restricted mode are allowed to attach/connect to the instance/database.
    - Commands
      - db2start admin mode <user userid | group groupid>
      - db2 quiesce <defer | immediate > <force connections> <instance instance_name>
        for < user user_id | group group_id>
      - db2 quiesce <defer | immediate > <force connections> <database database_name>
      - db2 unquiesce <instance instance_name | database database_name>

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Diagnostic Logging Enhancements

NOTIFYLEVEL	Description
0	Disables admin notification logging.
1	**IT'S TOO LATE** - This level is reserved for logging fatal and/or unrecoverable errors. It is possible that some of these conditions would require assistance from DB2 service.
2	**IMMEDIATE ACTION REQUIRED...OR IT COULD GET WORSE** - This level is for those conditions that require immediate attention from the SYSADM or /DBA.
3	**IMPORTANT INFORMATION, BUT NO IMMEDIATE ACTION IS REQUIRED** -This level is for non-threatening conditions that do not mandate immediate action, but may indicate a sub-optimal system
4	**FOR YOUR INFORMATION** - Routine information that can often be safely ignored.

- Complete Split of db2diag.log into 2 separate logs:
  - db2diag.log - intended for IBM customer service and L3
  - Administration notification log (admin log)
    - intended for end users (DBAs and sysadmins)
    - Administration notification log is NLS-enabled and translated into installation language
    - Use NOTIFYLEVEL database manager configuration parameter for granularity control of administration information that is logged (like DIAGLEVEL for db2diag.log)

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Backup, restore and rollforward

- Restore
  - Code page independent restore.
    - For example, restore 819 database on 850 system.
- Table space recovery
  - Only the log files required to recover the table space are processed.
    - Rollforward will skip over log files that are not required.
      Rollforward does not request that the user exit retrieve them.
- Rollforward to localtime
  - Allows the user to rollforward to a PIT that is local time versus GMT time.
- Planned improvement via FixPaks
  - Backup compression.
    - Please check the description of this in the FixPak release notes for further details.

Logging

- Dual logging
  - Introduced in V7.2 (V7 FixPak 3) - UNIX only
    - Set registry variable NEWLOGPATH2 to yes to enable.
      Second log path defaulted to value specified in logpath with '2' appended.
  - In V8
    - All platforms are supported.
    - Second log path enabled and configured via DB configuration parameter mirrorlogpath
      If set, dual logging is enabled when database is activated.
      Changes in the value take effect at next database activation.
  - Migration considerations from V7:
    - The derived path name for the second log path will be moved to mirrorlogpath
      Value will be value in logpath with a '2' appended if NEWLOGPATH2 was yes in Version 7.
- V8 increase max log space from 32 to 256 GB
  - Support more active transactions and longer running transactions that do more work.
- Logging scalability
  - Enhanced log bandwidth (parallel I/O on the log)

Logging (con't)

- Infinite active log
  - In V8, an active unit of work can span an infinite number of logs and there is no logging limit to the number of concurrent units of work.
    - Concurrent units of work are no longer limited by the size of the primary log (logprimary x logfilesiz).
  - Enable this by setting secondary log files (logsecond) to -1.
  - Usage considerations:
    - The user exit to archive logs must be active and capable of handling the storage of the logs.
    - Rollback and crash recovery may require that archived logs be retrieved.
    - Watch for:
      Long running, mostly inactive applications that hold the active log space. These are more likely in development when a commit may not be issued.
    - A warning is written to the administration notification log when current units of work exceed primary log allocation.

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Logging (con't)

- Planned improvements via FixPaks
  - Two new database configuration parameters
    - numlogspan- Number of logs spanned.
      Number of active log files one active unit of work is allowed to span.
      Can prevent long running mostly inactive applications.
    - maxlog - Maximum log per transaction.
      Maximum active log space consumed by one unit of work as a percent of primary log space.
      Similar to maxlocks, this will limit the amount of log space a unit of work can consume.
  - Please check the description of these in the FixPak release notes before utilizing them.
    - There may be minor changes made during their implementation.

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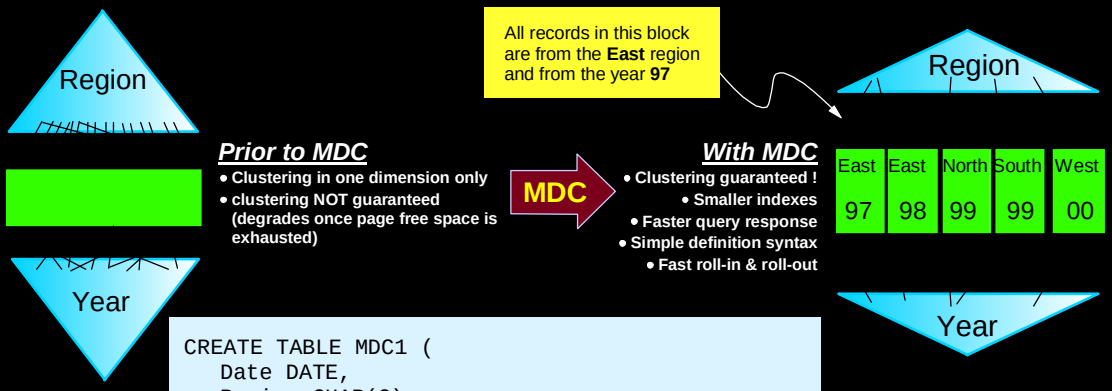
SQL Enhancements

- Merge SQL (UPSERT)
  - Ability to update base tables with transaction data from another table (MERGE into...)
    - An UPDATE operation for those rows already existing in the master table
    - An INSERT operation for those rows that do not exist in the master table
- Insert through UNION ALL
  - Separate tables can be included in a view, but maintained as one table
  - Ability to "partition" data across different tables
- Instead of Triggers
  - control update, delete and inserts against Views instead of base tables
- Informational Constraints
  - give DB2 information about constraints found in the data, rather than having DB2 maintain them
  - can result in better optimization decisions
- SQL in User-Defined Functions (Insert, Update, Delete)

Snapshot table functions

- Common DB2 API commands
  - many table functions are now available to check the status of DB2 objects
- Sample Table Functions
  - SNAPSHOT_AGENT(<dbname>, <partition>)
    - Returns agent information from application snapshot
      - SELECT AGENT_ID FROM TABLE(SNAPSHOT_AGENT('MYDB', 0)) AS S;
  - SNAPSHOT_APPL(<dbname>,<partition>)
  - SNAPSHOT_BP(<dbname>, <partition>)
  - SNAPSHOT_CONTAINER(<dbname>, <partition>)

Multidimensional Clustering (MDC)



Prior to MDC
- Clustering in one dimension only
- clustering NOT guaranteed (degrades once page free space is exhausted)

MDC

With MDC
- Clustering guaranteed !
- Smaller indexes
- Faster query response
- Simple definition syntax
- Fast roll-in & roll-out

```
CREATE TABLE MDC1 (
   Date DATE,
   Region CHAR(2),
   Color VARCHAR(10),
   YearAndMonth generated as INTEGER(Date)., . )
ORGANIZE BY DIMENSIONS (
   YearAndMonth, Region, Color)
```

- Provides range partitioning on multiple dimensions
- Reduces need for indexing (including clustered indexes), reorgainzations, and index maintenance

Multidimensional Clustering (MDC) Clustering rows via dimensions

- A CREATE TABLE option
- Co-locates rows with same key values in same data block
  - Primary & foreign keys
- Transparent to applications and end user tools

Data blocks - without MDC

SKU	Store	Date	Qty	Amt
101	21	04/02	1	1.50
101	21	04/02	1	1.50
101	7	04/02	2	3.00
101	7	04/01	6	8.11

SKU	Store	Date	Qty	Amt
101	7	04/02	1	1.50
101	21	04/02	3	4.10
101	7	04/01	2	3.00

rows

keys

Data blocks - with MDC

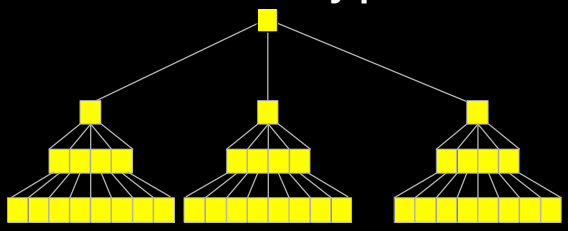
SKU	Store	Date	Qty	Amt
101	21	04/02	1	1.50
101	21	04/02	1	1.50
101	21	04/02	3	4.10

SKU	Store	Date	Qty	Amt
101	7	04/01	6	8.11
101	7	04/01	2	3.00

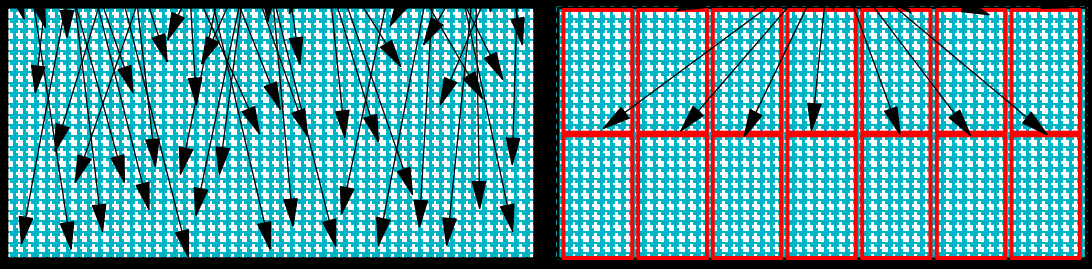
SKU	Store	Date	Qty	Amt
101	7	04/02	2	3.00
101	7	04/02	1	1.50

Multidimensional Clustering (MDC) Row Indexes, Block Indexes

Row Indexes -
one index entry per row



Block Indexes -
one index entry per block



□ = Row

DB2 Version 8 - Schwerpunkte

- **SMART Management**
  Konfiguration, Management,
  Tuning, Automatisierung...
- **Informations Integration**
  Federation
  Web Services, XML
  Replikation...

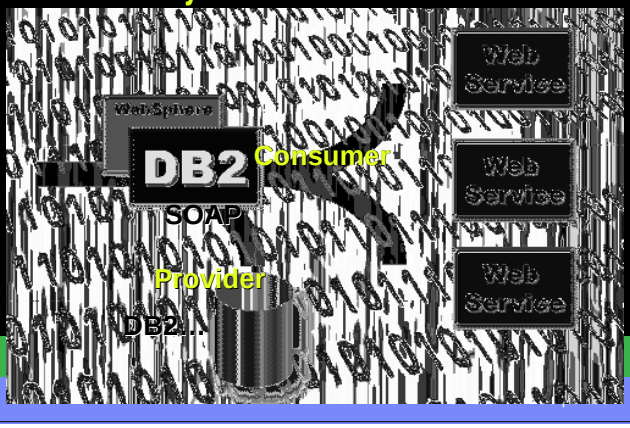
- **Entwickler Produktivität**
  Java, .NET
  Web Services, XML...
- **Robuste e-business Infrastruktur**
  Leistung, Skalierbarkeit,
  Plattformen, Verfügbarkeit...

438 neue Features und Funktionen

Informations Integration

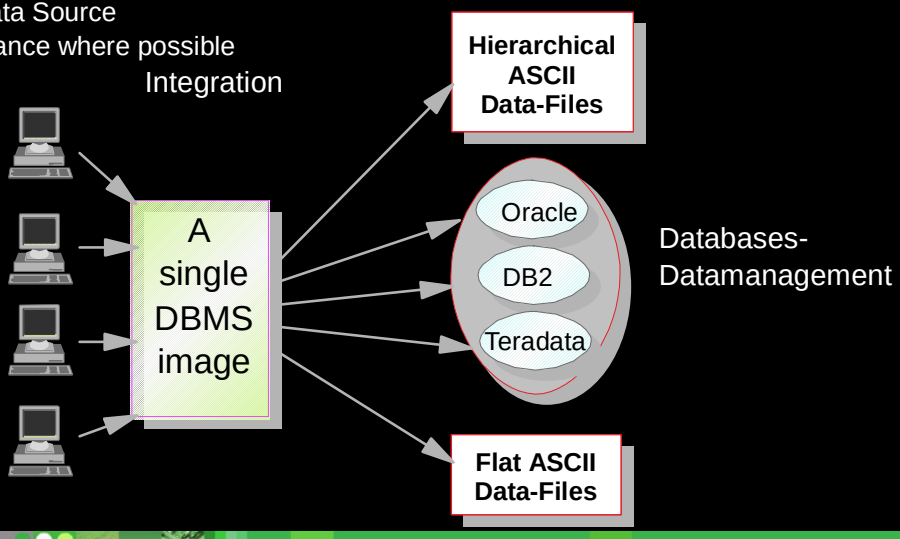
- Optimierter transparenter Zugriff integriert e-business Informationen
  - Schreib-/Lesezugriff auf verteilte DB2 und IBM Informix IDS Datenbanken
  - Schreib-/Lesezugriff via Web Services
- Erweiterte XML Integration
  - SQL Funktionen vereinfachen XML Verarbeitung
  - Integrierte XML Schema Validierung & XML Transformationen via XSLT
  - Flexible Speicheroptionen, Federated Sources / Destinations
  - WebSphere Studio bietet DB2 XML Productivity Tools
- Replikation

Informations Integration vereinfacht die Anwendungsentwicklung



Informations Integration - Was ist Federated Access?

- Convenient, transparent, high speed data access
- Uniform Access
  - Connect From Anywhere, To Anywhere
- Uniform Functionality
  - Regardless of Data Source
  - Uniform Performance where possible



Informations Integration - Federated Databases

- Query processor
  - Parser
  - Semantic processor
  - Optimizer
- Execution engine
  - Sort engine
  - Residual predicate
- Catalog
  - Data manager
  - Locking
  - Logging
  - Buffer manager
- Client access
- Transaction Coordinator
- Query gateway
  - Interface to sources

Oracle

Informix, Sybase, Microsoft SQL Server

DB2 UDB

Life Sciences Databases

Supports Advanced SQL

- Recursive SQL
- User Defined Functions
- Common Table Exp.

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Informations Integration - Federated Databases

- "Live", high-performance retrieval of data from multiple DBs
  - Application sees a single database
- Other data sources can be accessed using Table Functions
  - Broad source selection (e.g. OLE DB Table Functions)

```
CREATE NICKNAME O_EMP FOR
  DB2OS390.J15USER3.EMP

CREATE NICKNAME S_OFFICE FOR
  INFORMIX.J15USER1.OFFICE
```

```
SELECT
O_EMP.EMPNAME, S_OFFICE.OFFICENO
WHERE
O_EMP.EMPNO= S_OFFICE.EMPNO
```

EMPNAME	OFFICENO
Smith	C200
Jones	C202
Adams	C204
Miller	C206
Bennett	C208

A table EMP exists on DB2 for OS/390

EMPNO	EMPNAME
100	Smith
200	Jones
300	Adams
400	Miller
500	Bennett

Owner is J15USER3

A table OFFICE exists on Informix:

EMPNO	OFFICENO
100	C200
200	C202
300	C204
400	C206
500	C208

Owner is J15USER1

DB2 V8 | Überblick |
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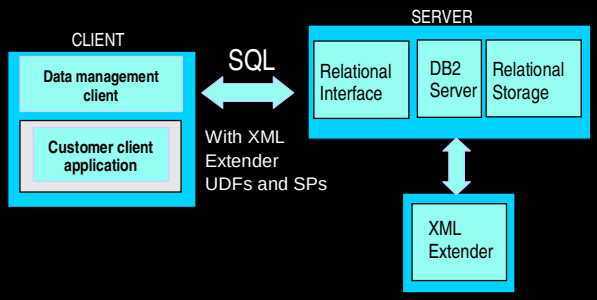
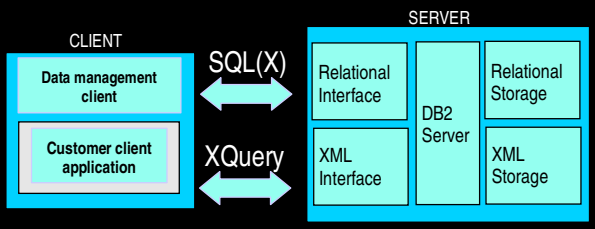
Informations Integration - DB2/XML Technology - Present & Future

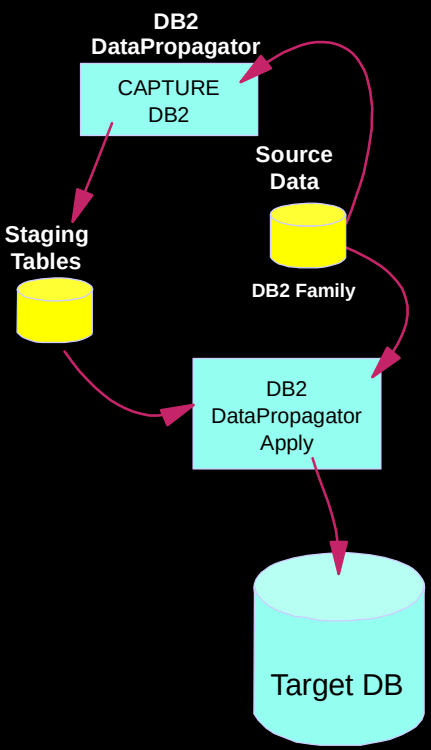
- Object–relational implementation (present)
  - Store,retrieve,compose,decompose, validate,extract,transform
  - Storage options
    - Store intact
    - Store as a collection of columns
- Hybrid XML-relational store (future)
  - SQL or XQuery
  - XML capabilities inside the engine
    - XML specific storage,query, indexing,privileges,transformation, schema,interfaces,search
    - Carries DB2 UDB engine core attributes: scalability,availability,reliability, manageability
    - Plus performance





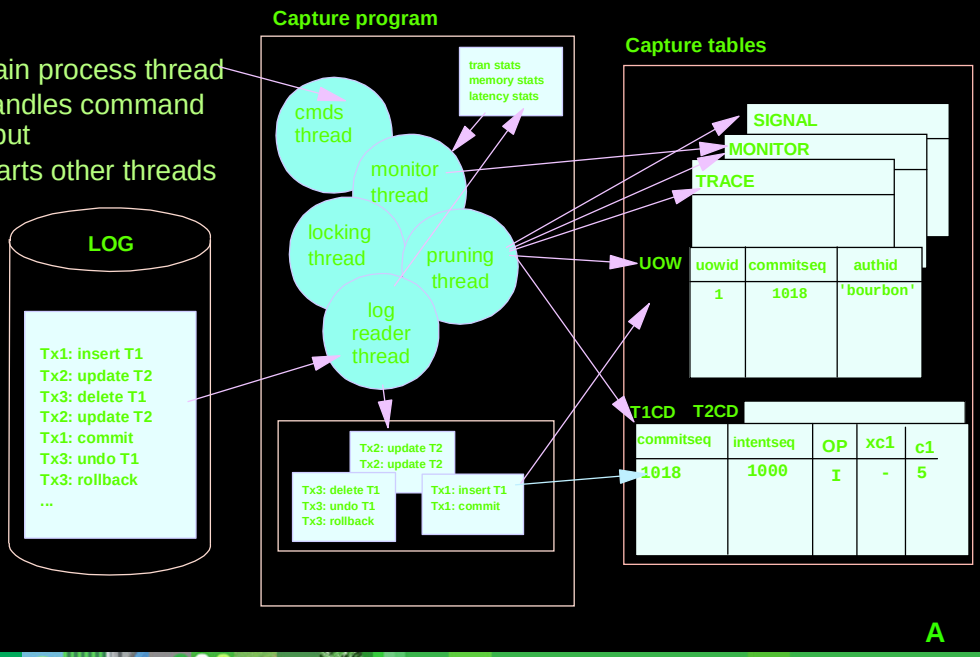
Informations Integration Replication Enhancements

- Performance
  - Multi-threaded transaction based Capture
  - Multiple Capture Schemas
  - Reduced need for joins
- Usability
  - New Replication Admin features
  - Monitoring
  - Less rules, product more adaptive
  - Long name support
- Reliability
  - Emphasis on continuous operation
  - Improved restart and failure algorithms
- Serviceability
  - Dynamic Trace Facility
- Security
  - Improved password management



Multi-Threaded Capture

- Main process thread
- Handles command input
- Starts other threads



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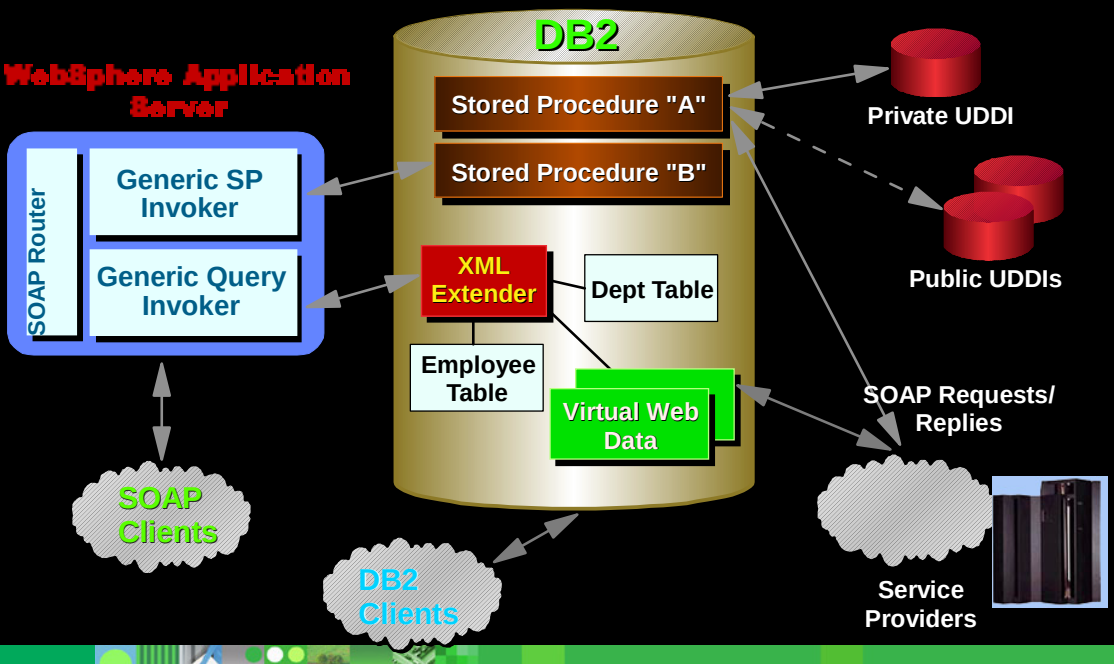
Informations Integration - DB2 Web Services



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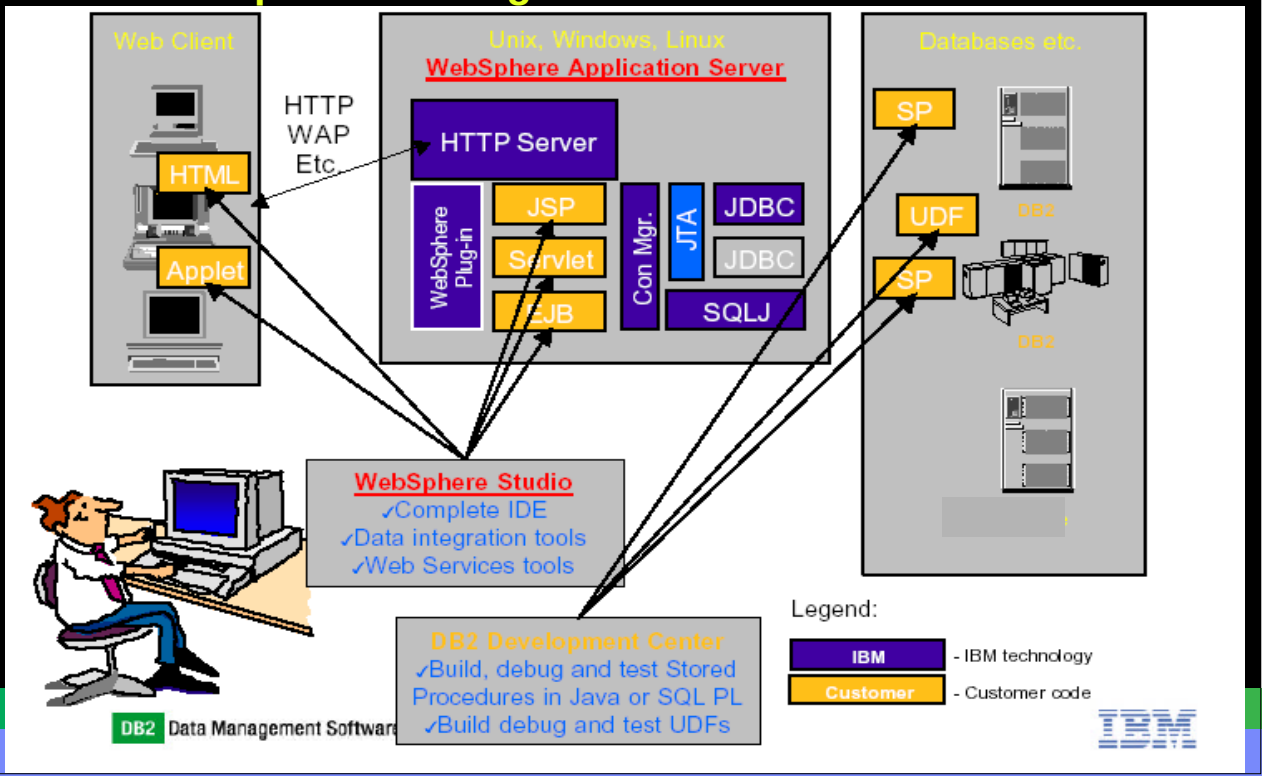
  Leistung, Skalierbarkeit,
  Plattformen,
  Verfügbarkeit...

438 neue Features und Funktionen

Entwickler Produktivität

- **Development Center**
  - **Wizards vereinfachen Entwickleraufgaben**
    - Java & SQL Stored Procedures
    - User Defined Functions (Tabellen, MQ Series Messages, OLE DB Quellen, XML Dokumente
  - **Add-ins zu gängigen Entwicklungsplattformen bieten nahtlose Integration**
    - WebSphere Studio
    - Microsoft Visual C++, Visual Basic, Visual InterDev
  - **Verbesserte SQL Hilfen**
- **Zahlreiche SQL Erweiterungen**

IBM WebSphere Lösung



Package Support

- Version Identifier for packages
  - allows different "versions" of the same package to exist in the database
  - production plan can be different from test plan
  - explain output will identify which version of a plan is being used
- New command to flush current active package cache
  - FLUSH PACKAGE CACHE

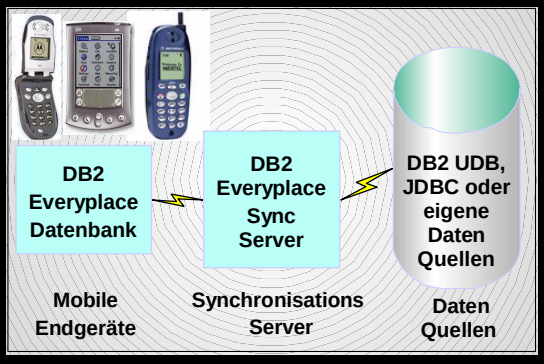
DB2 Version 8

Führende Technologie für Informations-Management und -Integration

- DB2 Strategie
- DB2 Version 8: Überblick und Neuheiten
- **Weitere Neuheiten aus der DB2 Produktfamilie**
  DB2 Everyplace
  DB2 Warehouse Manager
  DB2 Olap Server

DB2 Everyplace V8.1

- **Komponenten**
  - **DB2 Everyplace Datenbank**
    -nur ca. 180 KB groß
    -kein Administrationsaufwand
  - **DB2 Everyplace Sync Server**
    -JDBC kompatiblen Datenquellen, Dateien
    -Lotus Domino Datenbanken (neu)
  - **DB2 Everyplace Mobile Application Builder**
- **Neu in Version 8.1**
  - **Anwendungsentwicklung**
    -neben Java und C/C++ jetzt auch mit
    -Visual Basic, WebSphere Studio, Appforge
  - **Verschlüsselbare Tabellen**
  - **mehrere DB-Verbindungen & Wahl des Zielverzeichnisses**



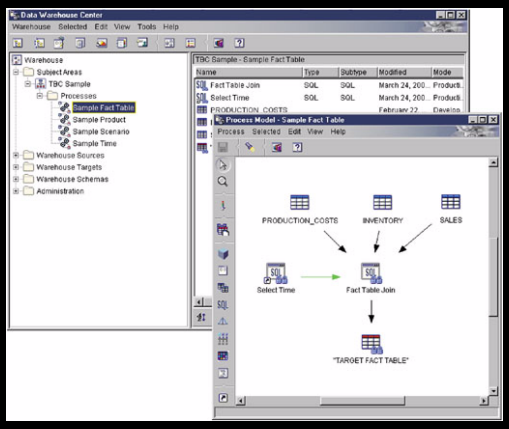
Client Plattformen:
- Palm OS
- Windows CE/Pocket PC
- Symbian V6
- QNX Neutrino
- embedded Linux, Linux
- Win32 (XP) und
- **J2ME MIDP**

Server Plattformen:
- AIX
- Linux
- Windows NT/2000/XP
- Solaris (beta)

Die relationale Datenbank für den mobilen Einsatz

DB2 Warehouse Manager V8.1

- DB2 Warehouse Mgr. Stärken
  - Erweitert Funktionen des DB2 Data Warehouse Centers
  - Agentenbasiertes ETML Tool
  - Integrierte Metadatenverwaltung
- Neu in Version 8.1
  - DB2 ESE Split & Load
    - schnelles Laden in multi-Partition Tabellen
  - Warehouse Server auf AIX
    - bisher nur Windows NT/2000
  - Neuer Linux Agent
  - SQL Update Fähigkeit
    - kombinierter Update/Insert



Erweitert die integrierte Data Warehousing Funktionalität von DB2 für komplexere Umgebungen

ibm.com/software/data/db2/datawarehouse

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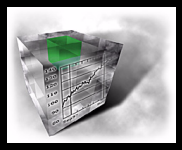
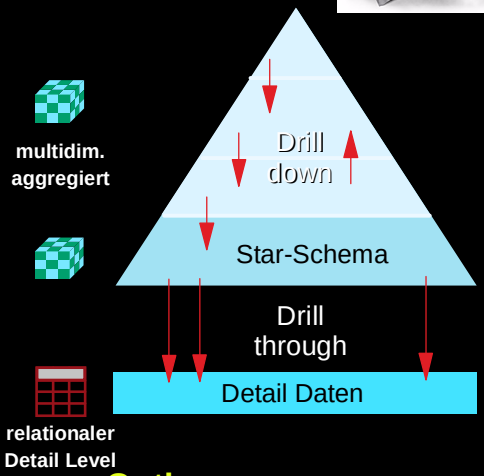
DB2 OLAP Server V8.1



- DB2 OLAP Server Stärken
  - RAMP - Report, Analyze, Model, Plan
  - Flexible Navigation
  - Leistungsfähige Berechnung
  - Lese- und Schreibzugriff
  - Zahlreiche Endbenutzer Tools
- Neu in Version 8.1
  - Hybrid OLAP
  - Paralleles Laden und Berechnen
  - Administration Services
  - Enterprise Services with High Concurrency Option



DB2 OLAP gibt Endbenutzern die analytischen Möglichkeiten, die sie benötigen

ibm.com/software/data/db2/db2olap

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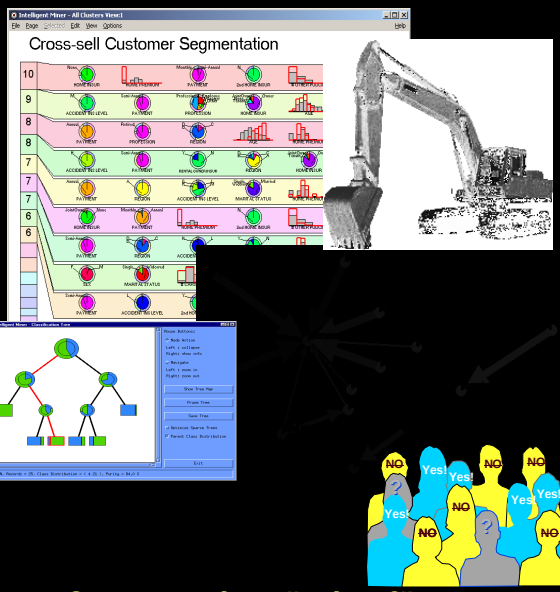
DB2 Intelligent Miner for Data Version 8.1

- **DB2 Intelligent Miner Stärken**
  - **Vielfältige Mining Algorithmen**
    - Clustering
    - Klassifikation
    - Assoziationsanalyse
    - Werte Vorhersage
    - Zeitreihenanalyse
  - **Parallelverarbeitung**
  - **Real-Time Scoring**
- **Neu**
  - **Intelligent Miner Modeling**
  - **Intelligent Miner Scoring**
  - **Intelligent Miner Visualization**

IBM DB2 Intelligent Miner for Data



Erkennt Muster und Zusammenhänge in großen Datenbeständen für Target Marketing, Kundensegmentierung, -bindung, -rückgewinnung, Cross-Selling, Betrugs- und Mißbrauchserkennung etc...

DB2 V8 | Überblick | ibm.com/software/data/iminer/fordata

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Die Rolle von DB2 - mehr Daten...einfacher verwalten

- **Unterschiedlichste Anwendungen**
- **Skalierbarkeit, Performance und Verfügbarkeit**
- **Leichte Einsetzbarkeit & Benutzung**
- **Total cost of ownership**