Upgrading a Consortium to V.16.02

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A Brief Excursion into the HBZ

• Founded 1973 to serve 5 new universities in NRW

• Responsibilities:
  • Service center for library automation and catalog production
  • R&D in library automation, consultant for libraries
  • Host for a bibliographic database to function as bibliographic utility for co-operative cataloging AND as an electronic subset of the existing Union Catalog

• Today HBZ is serving 1,195 libraries in the consortium

• ALEPH-500-Database: 72,000,000 records (statistics by Dec 2003)
  • 12,500,000 title records
  • 6,300,000 authority records
  • 850,000 subject headings
  • 50,000,000 holdings and items
Setup and Migration of Data

- Motives
- Organisational Matters and Project Status
- Setup Steps
- Alterations of Data Model
- Setup of Indexing
- Experiences - Setup and Migration
- Setup WWW-OPAC
Motives: Current Situation

- **ALEPH 500 Version 12.3**
  - We had to run a setup mainly based on functionalities of the pre-ALEPH System – no re-engineering of „HBZ-Verbund“ while migrating to ALEPH 500 in April 2000
  - „Last“ ALEPH 500 system in version 12.3
  - Heterogeneous Local Library Systems connected: Non-ALEPH systems and ALEPH systems in version 14.2

- **Functionalities of a Consortial Database**
  - Cataloging with 12.3 and 14.2 GUI clients needs emulation 14.2 → 12.3
  - Import of customers databases with de-duplication programs
  - Data replication
    - MAB2 services for Non-ALEPH local library systems (title, holdings, items, and authorities)
    - ALEPH-Cluster: Data replication between central database and ALEPH local systems
    - CAT-Download for SISIS local systems (i.e. Copy function from GUI to SISIS acquisitions module)
  - WEB-OPAC as gateway for external search services: virtual catalogs, metasearches
  - HBZ inter library loan (DigiBib): gateway via Z39.50 server
Motives: upgrade to higher version - 1

• Reasons
  • Ex Libris: support of ALEPH 500 version 12.3 will be discontinued
  • Changes in ALEPH Kernel to improve performance
  • To enhance breakdown safety of the central system

• Consequences from HBZ demands
  • Skip version 14.2, because only version 16.2 seems to be suitable
  • Hardware upgrades (new generation of machines)
  • Upgrades of OS etc. (Solaris 9, Oracle 9i, ...)

• Disadvantages of running an „early“ version 16
  • HBZ is one of the „pilots“
  • „Uncertain“ state of the programs (e.g. english version), frequent updates
  • Unsatisfactory documentation and handbooks, no „how to“-information from ICAU
  • 2 steps at one time: Unicode (14.2), new GUI-Client (16.x)
  • Status: Improvements in documentation and quality of released version
Motives: upgrade to higher version - 2

• **K.o. criteria**
  - No long falling off in production during migration
  - Test of the complete system (all data, all Indexing)
  - Test of all functions before start of production
  - Test of performance

• **Implementing lessons learned**
  - Experiences with migration to ALEPH version 14.2 (DACH)
  - Time frame: V. 14.2 would run only for a short period (V. 16 „ante portas“)
  - Migration + production running parallel was considered critical with existing hardware
Organisational Matters and Project Status

• Staff
  • Kernel of 4 (Setup, Decisions): 2 librarians, 2 computer scientists
  • Supported by experts from other teams – librarians and technicians

• Test migrations
  • Objective: Test of data migration with all data, Index setup, test of performance:
    A (HBZ): Indexing: small but representative, consistent subset of data
    B (ExL): Migration, Indexing: large, representative, consistent subset of data
    C (HBZ+ExL): Migration, Indexing, Performance: All data

• Status
  • Migration, Indexing: Tests A, B and C completed
  • Ex Libris testing of performance: 4/2004 completed: 0.82 sec / transaction
  • Implementation/test of all functionalities: in progress
  • Start of production of training system ALEPH v. 16.02 pre-release: April 2004
  • Start of production with ALEPH version 16.2 final release: July 26, 2004
Organisational Matters and Project Status:
Schedule - 1

- Start of project: May 27/28, 2003 Kick-off workshop with Ex Libris

- First release v. 16 english: End of May 2003
  - Start of basic setup: basically an upgrading of HBZ version 12.3 concerning formal aspects, i.e. changed structures of tables etc.

- First release v. 16 deutsch: July 17, 2003
  - Copying of basic setup into German version
  - Improvements on basic setup implemented

- Pre-release v. 16.02: Feb 19, 2004 + Hotfix 01 Mar 30, 2004

- Final release ALEPH 500 v. 16.02: Feb 27, 2004
Organisational Matters and Project Status: Schedule - 2

- April/May 2004: Training of library staff by HBZ
- July 2 –22, 2004: Migration of data in 2 steps, consequences are
  - restricted cataloging (no deletions of records)
  - No data services to upgrade the bibliographic utility (imports of third party data) during this period (DB, BNB, Casalini libri, etc.) or export data (other than ALEPH-Cluster)
- July 26, 2004: Start of production with ALEPH version 16.2
- Aug-Sep, 2004: Re-start of data imports in version 16.2
- August 2004: Re-start of data exports in version 16.2
- August 2004: Synchronizing authority files with ALEPH local systems
Organisational Matters and Project Status: Schedule - 3

• Why are we not ready at NAAUG meeting?

Importing data with de-duplication of customers failed its schedule:

• Kunst- und Musikhochschulen (Köln, Essen, Detmold): completed
• Bibliothek des Ruhrgebiets: completed
• UL Koblenz-Landau: June 2004
• Institutes at Bochum and Münster universities: June 2004
Holdings and Items: HBZ Data Model 12.3

HBZ60
Holdings records stored centrally

Title records

Relations and Indexing

37 ADMs
Items records stored centrally

Shortcoming:
Every user has own ADM
Alterations of Data Model

- **Data model Holdings and Items**
  - Items will be part of holdings records (MEX-Fields, repeatable)
  - Indexing of holdings and items informations in HBZ60 (a separate library, no longer in main library HBZ01)

- **Data manipulations during migration**
  - HBZ delivers demands, Ex Libris does the job
  - “Synchronizing“ central and local systems (synchronizing record identifiers)

- **Changes in authority file linking for ALEPH local systems**
  - Local ALEPH systems will hold their authority holdings, changes are replicated via ALEPH-Cluster
  - In v. 12.3 local ALEPH systems had no authority files, but had to uplink into the central database at HBZ whenever a name or subject heading had to be displayed in the local OPAC (expand functions)
Holdings and Items: HBZ Data Model 16.2

Holdings and Items records stored centrally

Relations

- **External:**
  - Local data (holdings and items) are linked via HBZ-record-Id in field 012 of a holdings record (HBZ60) to the title record in HBZ01.

- **Internal:**
  - ba) Internal table Z103 in ALEPH-Library HBZ01: Relation of Title records to Holdings (and Items) records
  - bb) Internal table Z103 in ALEPH-Library HBZ60: Relation of Holdings record to Title records
Holdings and Items: HBZ Data Model 16.2

- We achieved with the new data modelling:
  - No ADM data bases required
    - No ADM records to manage
  - HBZ60 includes all local data
    - Holdings and items information in one HBZ60 record
  - Indexing of local information solely in HBZ60
  - Gathering of items information in GUI‘s items workspace
    (no changes of librarian‘s workflows)
Local data: Holdings and Items records

### Owner encoding

```
LDR   L 00115vM2.01200024-----l
FMT   L ML
001   L $$aLA000148531
002a  L $$a200000118
004   L $$a20030805
012   L $$aHT006213739$$lIHBZ01
030   L ||5d||||||||
070   L $$a82
OWN   L $$aA0001
CAT   L $$aHBZ-SETUP$$b60$$c20030812$$lIHBZ60$$h1651
```

### Items data

```
MEX   L $$aHBZ60000002473-000010$$cHB C$$dBeschreibung$$e123456789_Signatur1$$gSignatur2-123456789$$iInventarnummer$$j20040416$$k01$$mBOOK$$nBestellnummer$$o20040416$$rInterneNotiz$$sHBZ-SETUP$$u20040416$$vOPAC-Notiz$$wAusleihnotiz
MEX   L $$aHBZ60000002473-000020$$cHB DX$$dBeschreibung$$eSignatur3$$gSignatur4$$iInventarnummer$$j20040416$$k01$$mBOOK$$nBestellnummer$$o20040416$$rInterneNotiz$$sHBZ-SETUP$$u20040416$$vOPAC-Notiz$$wAusleihnotiz
```
Setup of Indexing - 1

2 Steps:

• **1. Step: functional equivalent to current status in v. 12.3**
  - Taking over of setups of current productive version (12.3 -> 16.01)
  - Modifications are only made if technically required

• **2. Step: Revision**
  - Motive: „Everything is evaluated according to current Best Practice in customer libraries and may require a re-design.“
  - Indexing algorithms have high priority (performance)
Setup of Indexing - 2

• Aspects for decisions made on Direct (system ID, record ID, ISBN etc.), Word, and Phrase indexes:
  • Experiences of using current version 12.3, useful?
  • Use in GUI, WWW, Z39.50, internal?
  • Browse and/or search?
  • Customer‘s demands
  • Standardization and „clearing-up“

• New concept in HBZ60 (local data):
  • Complete new setup für indexing (Indexes built, Sort keys)
  • Direct indexes for browsing
  • Different Filing routines (alphabetic and numerical)
Experiences following Setup and Migration in V. 16

- Positive on running times for Indexing
  - But: No experiences for production scenario yet to report

- Local ALEPH systems in libraries: Need to change matters concerning
  - Synchronization between local and central indexing concepts (filing), authority replication
  - Lessons learned: Upgrades of central ALEPH system requires coordinated maintenance and/or upgrade of connected local ALEPH systems and, maybe, vice versa?
Setup WWW-OPAC

• Status:
  • Realization of a first test version March 2004: completed
  • Motive: Performance testing utilizing this setup

• Objectives:
  • Provide access to total HBZ data (Union Catalog function)
  • Make search and presentation in GUI and WWW „identical“
  • Make presentation of data according to the demands of reference librarians (the world-wide-user has access to these data via many portals anyway)
  • Future: Make integration of new/other functionalities possible (e.g. linking a search to remote sources/datenbases)
Setup WWW-OPAC: Standard Search

Standardsuche

- Direktindices —

und — Direktindices —

und — Direktindices —

OK Verwerfen

Suche beschränken auf:

Sprache: alle Jahr von: Jahr bis: [UW] (Nutzen Sie ? für Trennungszeichen, wenn nicht mit und bis suchen)

Zweigstelle: alle

Suchtipps:

Füllen Sie so viele Felder aus wie Sie möchten. Je mehr Zeilen Sie belegen, desto kleiner wird die Zahl Ihrer Suchergebnisse sein. Wenn Sie die Option Exakte Wortfolge wählen, können Sie eine Wortfolge wie Sankt Pauli eingeben, und das System wird nur Titel suchen, in denen diese Wörter direkt nebeneinander stehen.

Sie brauchen Klein- und Großschreibung nicht zu beachten. Die Eingabe von computer findet sowohl Titel mit computer, Computer als auch COMPUTER.

Zwischen den Wörtern wird eine UND-Verknüpfung angenommen. Sie können auch die Booleschen Operatoren AND, OR und NOT in Ihrer Suchanfrage verwenden. Zum Beispiel können Sie Farm OR Bauernhof eingeben, um die Titel zu finden, die entweder Farm oder Bauernhof enthalten.

Setup WWW-OPAC: Short List Titles

![Setting up a WWW-OPAC short list of titles](image)

The image shows a screenshot of a browser window displaying a catalog search interface. The interface is in German and includes a list of entries with details such as author, title, and publication year. The list is sorted by title and display the following entries:

2. "Beckmann, Thomas: Beckmann / Interview Alex Hibart. 1991"

Additional options include the ability to switch between different views such as Vollanzeige (full view), Speichern/Senden (save/send), Auswahlliste (select list), In den Korb (in the basket), and Modifizieren (modify).
# Setup WWW-OPAC: Short List Holdings

![Image showing a screenshot of a computer interface with a list of titles and their details, including owner and ID numbers.]
SUN Cluster 3.0

- Motives
- Concepts
- Configuration
  - Hardware
  - Storage
SUN Cluster 3.0: Motives

- Motives to cluster machines
  - Safety (no single-point-of-failure)
  - Performance (optimized utilization of resources)

- Safety
  - Machines: Monitoring and cluster-failover (agents: hw, oracle, aleph)
  - Storage: Raid-5, Raid-1 (sds instead of veritas, SAN from SE3510)

- Performance
  - Experiences of running V. 12.3 (KVK, Digibib): Mass remote retrievals
    - Processes (server / background processes) negatively influenced
    - Resources (CPU, disks, network) heavily tied up
SUN Cluster 3.0: Concepts

• 2 clustered machines
  • These machines are in charge for production. They identify themselves virtually as one system to the outer world (Okeanos).
  • During normal loading of the system the load of the application ALEPH 500 is distributed nearly symmetrical on both machines (e.g. WWW-OPAC on the left, Z39.50 on the right machine) using agents.
  • If one machine encounters a failure the other machine automatically takes charge of all functions and processes alone (failover).

• Standard agents
  • Hardware: cpu, memory, ... (SUN, Cluster functionality)
  • Oracle: server, listener, ... (SUN)

• Special agents
  • Developments (ExLibris, HBZ)
  • Representations: ALEPH-Modules -> run processes -> handled by agents
  • Agent-builder (SUN)
SUN Cluster 3.0: Configuration - 1

• Hardware
  • Production system „2-node-failover-cluster“
    • Machines: 2 * V1280 (12 CPU, 24GB RAM)
    • Storage: 4 * SE 3510 (12*73 GB), controller, switches
  • Test system (development)
    • Machine: 1 * V1280 (12 CPU, 24GB RAM)
    • Storage: 1 * SE 3510
  • Data services (batch downloads)
    • Machine: 1 * V880 (4 CPU, 8GB RAM)
    • Storage: 1 * SE 3510
  • Consequences for your computing center
    • Space, UPS (USV), air condition, dimension of mains
SUN Cluster 3.0: Configuration - 2

Okeanos

Triton

Thalia
SUN Cluster 3.0: File systems

Node1 (poseidon):
- CAT
- REP
- INDEX
- IMP/EXP
- ORACLE

LFS:
- /oracle (20)
- /exlibris (140)

SFS:
- /oradata0 (200)
- /oradata1 (200)
- /archivelog (50)

Node2 (amphitrite):
- WWW
- Z39.50

GFS:
- /hbz (30)
- /log (50)

LFS:
- /oracle (20)
- /exlibris (140)
Oracle 9i

- HBZ-Specifics
- Applications
  - RMAN-Backup
  - Duplicate-DB
  - Standby-DB
  - Alternative Oracle-RAC
Oracle 9i: HBZ-Specifics

- **Current situation**
  - Data to handle (400 GB / 260 GB in 2000), availability (23h x 7d)
  - Responsibility for database administration (design, install, backup, upgrade, ...)
  - Support by Oracle (Licence)

- **Hardware configuration and other changes**
  - Version 9.2.0.3.0 64bit (instead of 8.0.6.2.0 32bit )
  - shared-server (instead of dedicated)
  - datafiles (File system instead of Raw-Devices)
  - backup (netvault instead of networker)
  - others
Oracle 9i: Applications - 1

• RMAN-Backup
  • Concept: rman utilizing rcvcat
  • Advantages:
    • open-db backup, PIT-recovery
    • Differential-backup (full, inc, archivelog)
  • Disadvantages:
    • Archivelog, no disaster-recovery

• Duplicate-DB
  • Duplicates Oracle-Instance from RMAN-backup
  • Options: PIT, target (computer, datafiles)
  • Applications
    • Parall test systems (test functionalities, performance, etc.)
    • Consistent exports of data (MAB-Service, Retrieval-DB)
Oracle 9i: Applications - 2

• Standby-DB
  • Concept: copy & apply archivelog
  • Advantages:
    • Availability (fast activation in course of a fault)
    • Safety: (timely) decouple from user-dml („drop“)
  • Disadvantages: Costs (Disks)

• Alternative Oracle-RAC
  • Concept:
    • HA (high availability): seperated node-instances
    • RAC (real application cluster): integrated cluster-instance
  • Advantages:
    • Performance („cache fusion“)
  • Disadvantages: Costs (Licence, veritas)
Thank you for Your Attention!

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Digitale Bibliothek:  www.hbz-nrw.de/produkte_dienstl/DigiBib
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