

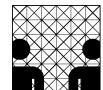


Seminar Autonome DatenBankSysteme

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Datenbanken und Informationssysteme

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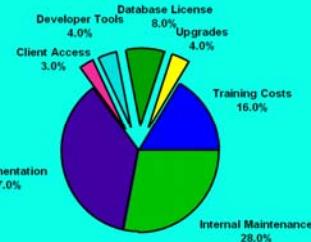


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Folie aus VLDB'04-Tutorial:
Self-Managing Technology in Database Management Systems,
S. Chaudri, Microsoft; B. Dageville, Oracle; G. Lohman, IBM

Motivation (1)

Human Costs Dominate in Database, Too



81% is “People Cost”

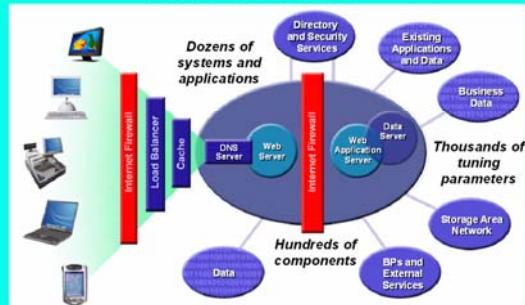
Source: The AberdeenGroup, 1998
<http://relay.bvk.co.yu/progress/aberdeen/aberdeen.htm>

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Motivation (2)

Houston, we have a problem ...
Complex heterogeneous infrastructures
are the norm!

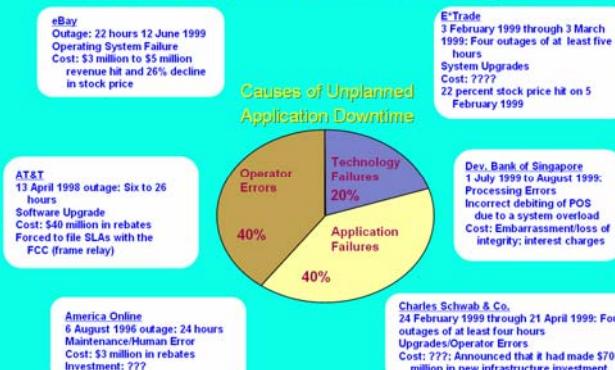


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Motivation (3)

Making the Front Page



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Motivation (4)

Reducing the TCO

- Management costs a major part of total IT spending
 - Cost of HW decreasing while cost of managing systems is increasing
 - IT System form core of business today
 - Customers and suppliers deal directly with IT systems over the web
 - Reliable IT Infrastructure is critical to success
 - IT Performance = Business Performance
 - Increased reliance on IT and explosion in data volume require more administrative staff
 - Limited availability of skilled labor results in spiraling DBA salary
- Increased business competitiveness requires reduction in operating expenses
 - IT Managers being asked to do more with less \$\$

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Motivation (5)

Does this look familiar?



"If it's so efficient, why doesn't it fix itself!"

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Motivation (6)

Managing Increasing Complexity

- Increase in Complexity & Size of Applications
 - Database workloads are more mixed (e.g. OLTP and complex reporting).
 - Database workloads are more dynamic.
 - Data size is growing rapidly
 - ☞ Multi-terabytes are no longer the exception!
- DBMS vendors have responded to these challenges by
 - Enlarging the scope of existing features
 - New access structures, complex optimizations
 - Complex hardware architectures like clusters or MPPs
 - Adding new features in the server
 - Objects, XML, OLAP, data mining, ETL
 - Replication, high-availability, ...

☞ Managing/tuning a modern database system requires a very high degree of expertise!

Motivation (7)

The Idea

Wouldn't it be great if your
Database (and entire system!)
were as easy to maintain
and as self-controlled
as your
refrigerator?



Motivation (8)

What Is The Self-Managing Vision?

- “Intelligent” open systems that...
 - § Manage complexity
 - § “Know” themselves
 - § Continuously tune themselves
 - § Adapt to unpredictable conditions
 - § Prevent and recover from failures
 - § Provide a safe environment



Motivation (9)

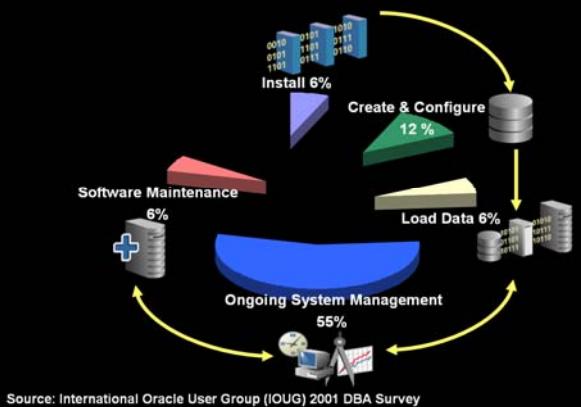
Huge Scope of DBA Responsibilities

- Initial Design & Layout
 - Hardware configuration
 - Logical database design
 - Physical data layout (partitioning, allocation to nodegroups, clustering)
 - Auxiliary data structures (indexes, view materializations)
 - Configuration parameters (hundreds!)
 - Security policies, groups, userids
- Dynamic Monitoring & Adjustment
 - Database statistics to collect and when
 - Clustering and Reorganization
 - Memory allocation, esp. buffer pool sizes
 - System / query status
 - Problem determination (deadlocks, bad plans, ...)
 - Visualization of all the above



Motivation (10)

Where DBA's spend their time



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Motivation (11)

Ongoing System Management

55% of DBA's time is spent in ongoing management, monitoring and tuning

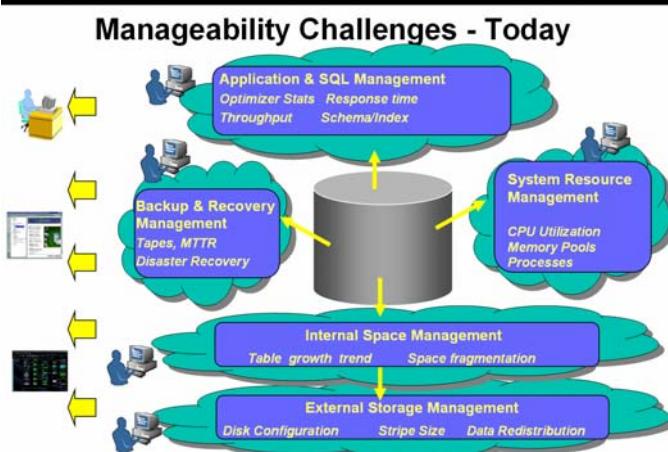
- Performance Diagnosis & Troubleshooting
- SQL & Application Tuning
- System Resource Tuning
- Space & Object Management
- Backup

Source: International Oracle User Group (IOUG) 2001 DBA Survey

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Motivation (12)



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Motivation (13)

Core Capabilities for Enabling Self-Managing Systems

- Problem Determination
- Common System Administration
- Adaptive Monitoring
- Solution Install
- Policy-based Management
- Complex Analysis
- Heterogeneous Workload Management

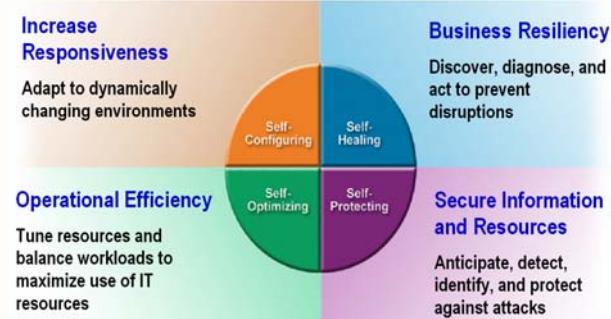


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Motivation (14)

A Self-Managing Taxonomy (Self-CHOP)



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Motivation (15)

Self-Managing Deployment Model



	Basic Level 1	Managed Level 2	Predictive Level 3	Adaptive Level 4	Autonomic Level 5
Characteristics	Multiple sources of system generated data	Consolidation of data and actions through management tools	System monitors, correlates and recommends actions	System monitors, correlates and takes action	Integrated components dynamically managed by business rules/policies
Skills	Requires extensive, highly skilled IT staff	IT staff analyzes and takes actions	IT staff approves and initiates actions	IT staff manages performance against SLAs	IT staff focuses on enabling business needs
Benefits	Basic Requirements Met	Greater system awareness Improved productivity	Reduced dependency on deep skills Faster/better decision making	Balanced human/system interaction IT agility and resiliency	Business policy drives IT management Business agility and resiliency

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Ziele des Seminars ADBS

- Die Bedeutung autonomer Mechanismen in DBS verstehen
- Autonomie-Grade und Machbarkeit abschätzen können
- Autonomie-Eigenschaften führender DBMS kennen lernen
- Autonomie-Grade existierender DBMS vergleichen können
- Wissenschaftliche Texte erarbeiten und Inhalte aufbereiten können
- Wissenschaftliche Texte verfassen können
- Wissenschaftliche Inhalte präsentieren können
- Wissenschaftliche Diskussionen führen können

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<http://sites.computer.org/debull/A06sept/issue1.htm>

Basis-Literatur



The screenshot shows a web browser window displaying the 'Data Engineering Bulletin - Profile Finder' page. The URL in the address bar is <http://sites.computer.org/debull/A06sept/issue1.htm>. The page title is 'Bulletin of the Technical Committee on Data Engineering'. It features a large header 'Data Engineering' with the IEEE Computer Society logo. Below the header, it says 'September 2006 Vol. 29 No. 3'. The page contains several sections: 'Letters', 'Special Issue on Self-Managing Database Systems', and various articles and editorials. The layout includes columns for article titles and authors, along with small images and icons.

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Themen(blocke)

1	23.10.2006	Motivation, Organisation, Themenvergabe	N. Ritter
2	30.10.2006	fällt aus; aber 31.10.06, 14:30: Themenverfeinerung 4 und 5	N. Ritter
3	06.11.2006	Autonome Datenbanksysteme – Überblick; Themenverfeinerung (6,7,8) und (9,10,11)	N. Ritter
4	13.11.2006	Autonome Services	Schulz
5	20.11.2006	Self-* Storage	Rinneberg
6	27.11.2006	Autonomic IBM DB2	Hinkelmann
7	04.12.2006		Buttkus
8	11.12.2006		Voigt
9	18.12.2006		Haasenleder
10	08.01.2006	Autonomic Microsoft SQL Server	Okroj
11	15.01.2006		Von Fintel
12	22.01.2007		Maniseng
13	29.01.2006		Lipinski
14	05.02.2006	Vergleich	Alle Teilnehmer

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Organatorisches (1)

- Verfeinerung der Themenblöcke ((6,7,8) und (9,10,11))
 - Vorschlag durch die Teams selbst
 - Vereinbarung/Festlegung in 3. Treffen
- Ausarbeitung
 - 8-10 Seiten pro Vortrag, Template auf der Seminar-Web-Seite
 - Abgabe: 1 Woche vor Vortrag!
 - Veröffentlichung auf Seminar-Web-Seite
- Vortrag
 - Dauer des (reinen) Vortrags: ~ 1 Stunde (mindestens 50 Minuten!)
 - danach Diskussion
 - der Inhalte und
 - der Güte des Vortrags an sich
 - Kriterien: Vortragsstil, Foliengestaltung, Klarheit der Darstellung, Verständlichkeit, Tiefgang, Nutzung von Beispielen, Kompetenz in der Fragenbeantwortung, etc;
 - schriftliche Bewertung durch alle Zuhörer anhand vorgegebener Kriterien

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Organisatorisches (2)

- Vergleich der Autonomie-Eigenschaften
 - Schriftliche, stichwortartige Vorbereitung (1-2 Seiten) durch alle Teilnehmer
 - Gemeinsame Diskussion
 - Schriftliche Ausarbeitung durch Teilnehmer (einzelnen, gemeinsam oder in Gruppen?)
 - Veröffentlichung auf der Seminar-Web-Seite

<http://vsis-www.informatik.uni-hamburg.de/teaching/ws-06.07/adbs/>