



Data Warehousing and Business Intelligence in the Public Employment Service Austria (AMS)

or: What you can get/expect for 3%

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Arbeitsmarktservice Österreich / Public Employment Service Austria



Austria 2007

- Population 8.3 million
- labour force 3.9 million
- employment 3.3 m.
- entries into/exits out of employment 1.5 m.
- unemployment rate 4.4% EU (6.2% national)

AMS-Workload

- approx. 1 million unemployment benefit claims –
approx. *3.500 million Euro*
- 860.000 subsidy cases („ALMP“) - 846 million Euro
- 775.000 persons unemployed (at least once)
- 320.000 vacancies filled
inflow notified vacancies: 370.000
- **29 million page-views/month: www.ams.or.at !**

AMS – Arbeitsmarktservice Österreich

- Since 1995 an independent organization with a 3-tiered hierarchy:
 - federal (1 head office) + regional level (9) + local (99)
4.500 employees
 - Employer-employee boards at all 3 levels (advisory / supervision)
- Business areas:
 - SFA / SFU - placement
 - AMF - employment promotion (“ALMP”)
 - ALV - unemployment insurance administration
 - ABV - foreign labour administration
 - Support (ICT, Public Relations, ...)

ICT and BI / Data Warehousing

- 1994 to... 2010 - AMS2000/AMS2000*plus*:
 - out-sourcing (amsbg / a Siemens company)
 - 1994 – 2000: 300 Mill. Euro
 - recently: approx. 50 million € / year
- AMS: 2 ICT-departments for strategy, organization, coordination, IT-controlling
- IT-developement according to the following principles:
 - **Focus on**
 - Customers: job-seekers and enterprises
 - Self-Service-Tools (eJob-Room, Call Center,...)
 - **Management Information System via Data Warehousing**
 - **BI: in-sourcing** of knowledge; technology through AMS2000/AMS2000*plus*

Operational systems

- administration of business cases - with all details
- focused upon a single area (ALMP, placement,...)
- data are changed, no history

**help us run the enterprise
operation day-to-day
OLTP**

Informational systems (BI)

- analyzing data and making decisions
- span different areas with large amounts of related operational data.
- (aggregated) data in a historical perspective are not changed

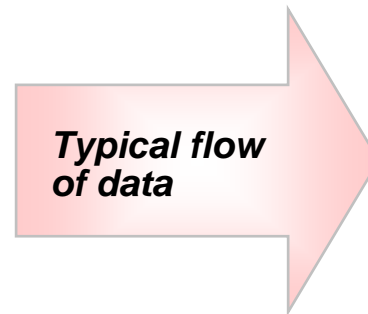
**decision-making!
OLAP**

ICT & BI: Operational vs. Informational Systems in the AMS / examples



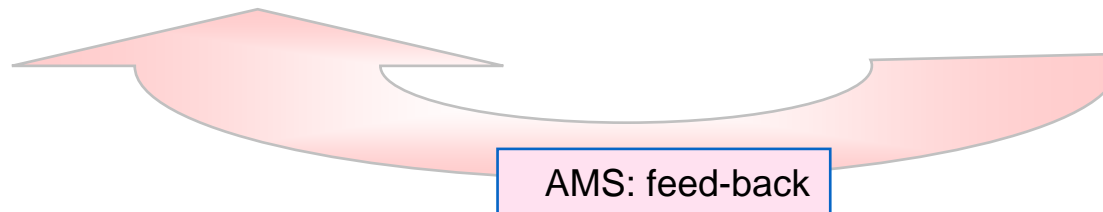
Operational systems

- PST: administration of job-seekers
- AMF: administration of ALMP-interventions
- BTR: administration of enterprise-customers



Informational systems

- AMB, BVS, AMF, BSC, targets, ...
- AMF, BSC, targets
- SFU, BSC, targets



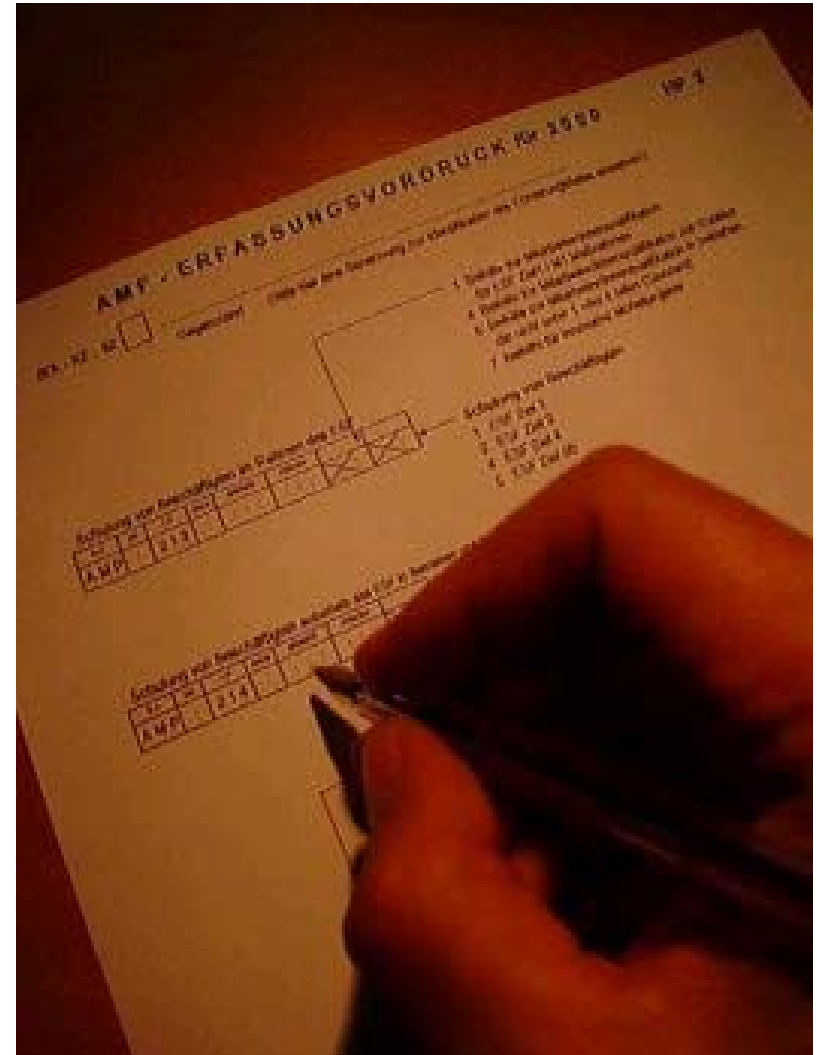
Why BI in an NPO?



1997 (and before):

- **Operational and organizational problems**
 - heterogenous data / diverse media
 - Insufficient knowledge about data
 - problems in reporting and controlling
 - partly manual or with external research institutions
 - sometimes even on paper
 - time-lag!
 - Incomparable „results“
- **Budget:** regional ALMP budget 25 million Euro overdraft 1996
- **Strategy:**
 - increased demand for information (MbO, Scocard, LMP-targets)
 - independence
 - **optimization of resources**

Why BI? – Well, ...before ...



Management by objectives



Decentralized labour market policy, centralized MbO...

- **Approach:**
 - **reduce duration of unemployment**
 - **spread the risk of unemployment**

- mainly through promotion (ALMP-programmes)
 - LMP targets and process targets
 - Customer orientation
 - Objective results through external data
 - Labour market-data
 - In-depth analyses

Management by objectives / targets 2008



Main process	Labour Market Targets 2008	Indicators	Monitoring parameters
Services for job-seekers	Early intervention in support of young and older people	number of entries into LTU of unemployed persons/ apprenticeship seekers > 6 months, outflow of older people (> 45/50 y.) into work within 6 months of registration	sustainability of employment
	Prevent long-term unemployment	number of entries into LTU (> 1 y.)	
	Integrate long-term jobless into the labour market	outflow of long-term jobless into work	number of job entries of long-term unemployed (12 months), sustainability of employment
	Improve effectiveness of training measures	outflow into work of job-seekers within 3 months after training	sustainability of employment
Services for Enterprises	Increase market share	number of new vacancies with job specification „completed apprenticeship or higher qualification“	
		vacancies filled including apprenticeship	
Promotion of equal chances to women and men	Facilitate re-entry into the labour market after parental leave	outflow into work of women within 3 months after training	ratio of women/men in qualification measures (budget, persons), sustainability of employment

Management by objectives / targets 2008



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Following the Strategy --- Scope of BI in the AMS (examples)



- LMP-objectives since 1998
- Subsidies (ALMP) 1999
- Enterprise customers / vacancies 2000
- Unemployment insurance 2001
- Monitoring 2003
- Labour market statistics / unemployment 2004
- ALMP-budget from SAP-BW 2004
- AMS-Score Card 2004
- Call center 2005
- eJob-room 2006
- „Placement“ – controlling 2007

2008: Scope of BI in the AMS



Data Warehousing is of strategic as well as operational importance in the AMS, because:

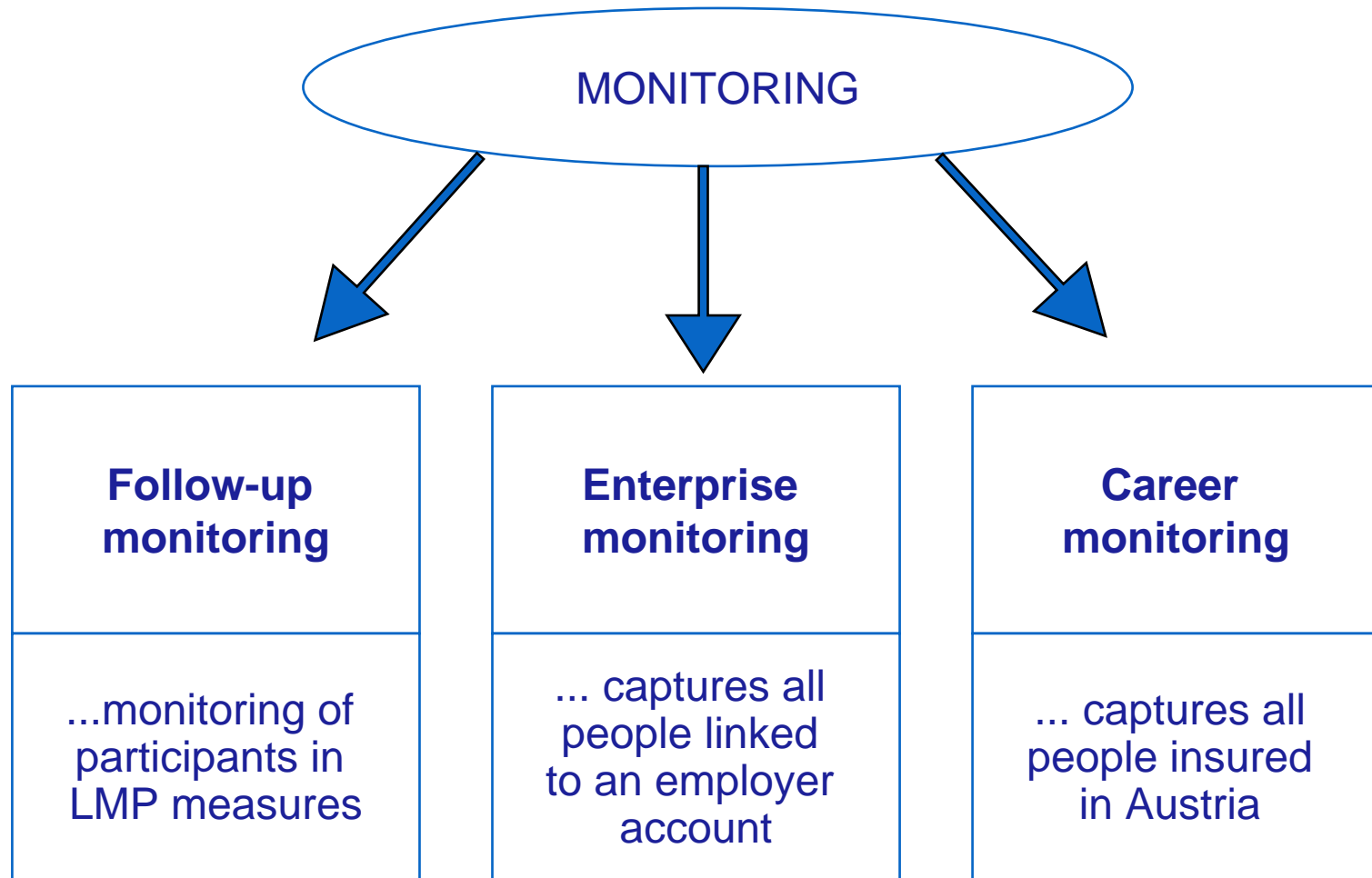
- Framework: the setting of AMS
 - Key data for strategic labour market policy decision
 - AM-DB – Labour Market Database: provides a unified data basis for research institutions
- Supports Management by Objectives, Controlling:
 - LMP objectives
 - AMS-Score Card
 - ALMP budget (e.g. 2004: € 22,35 = 100%)
- Feed back-loop to operational systems (CRM-information, ...)
- Basis for CRM, data mining
- Reporting – internal as well es external
 - e.g., ESF-reporting (European Social Fund)
- Range and depth (granularity), complexity
 - Data for almost any business area (placement, call center,)
- Optimization of resources (ALMP)...

Highlight: Monitoring



- Quantitative evaluation of the PES data by means of *external data*, especially through the connection of detailed information about employment as well as unemployment:
 - for a better understanding of relationships on the labour market
 - for evaluation of the PES-driven LMP-measures – **effectivity and efficiency!**
 - support for the yearly planning of LMP-measures
 - contract negotiations with training institutions
 - development of an AMS-ScoreCard
 - basis for research-projects

Highlight: Monitoring

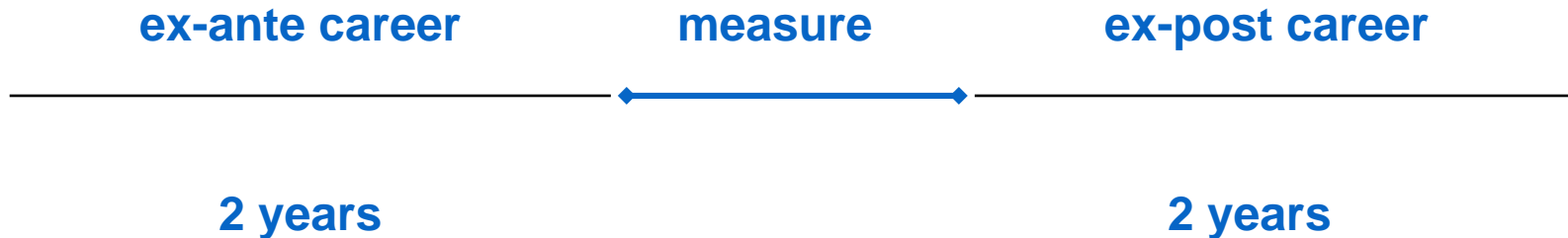


Highlight: Monitoring / follow-up



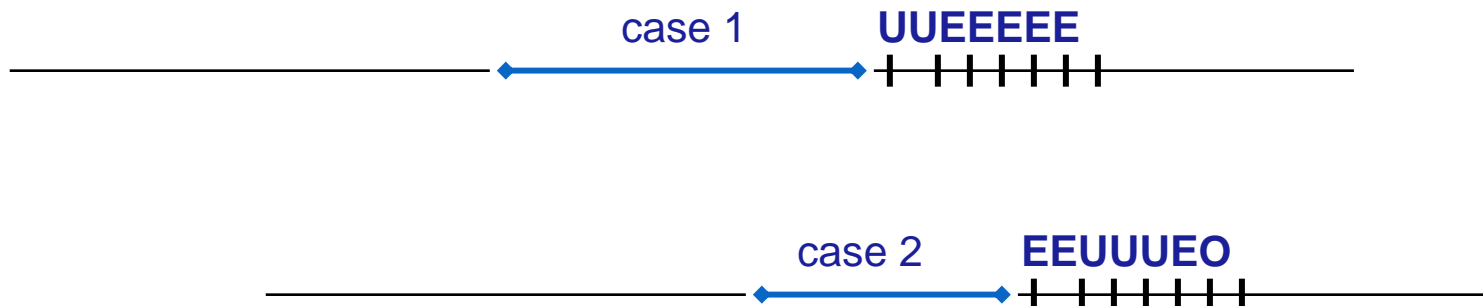
Principle:

Comparison of time ,before' and ,after' AMS-intervention:



Example:

Dominating Labour market position by „main indicator“ in ex post career



Highlight: Monitoring / follow-up



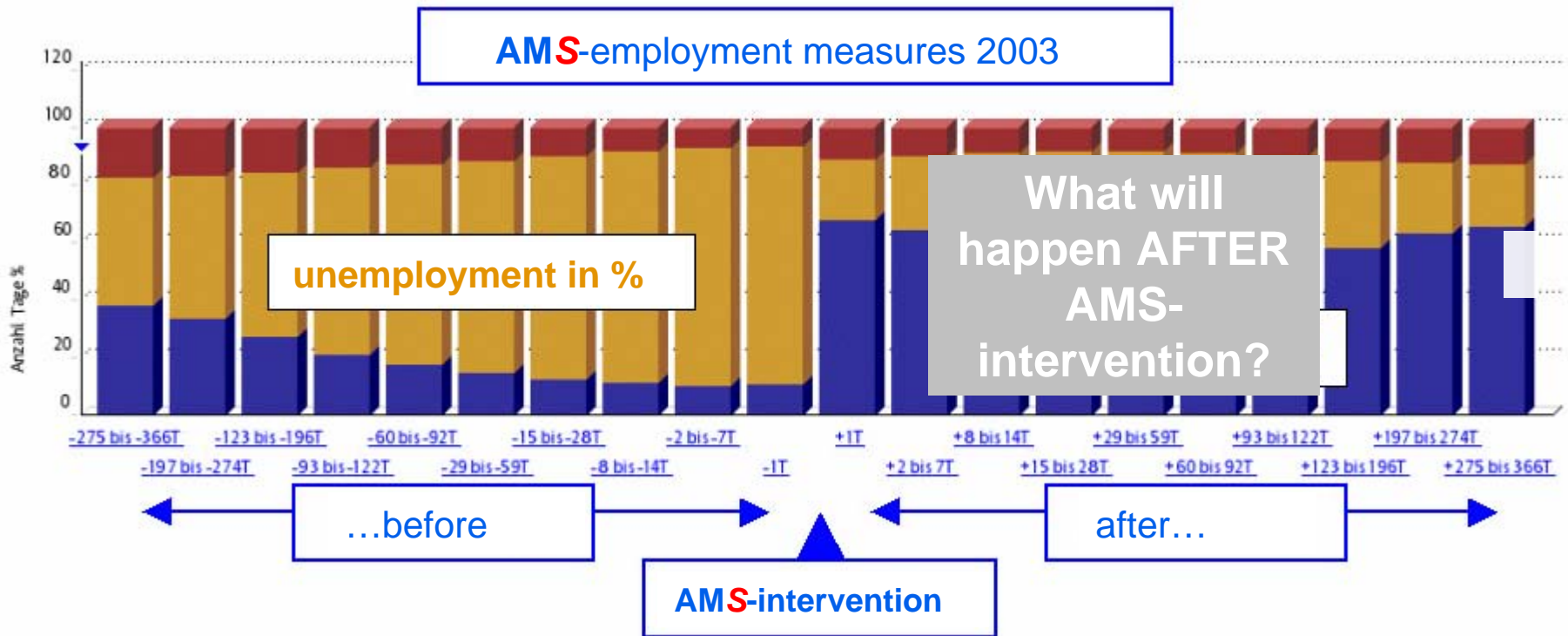
Concepts (indicators) to measure effectivity:

- key date approach \Rightarrow stock
- volume approach \Rightarrow number of days
- „those affected“ approach \Rightarrow number of persons
- stability approach \Rightarrow number of status changes
- finance approach \Rightarrow average contribution base

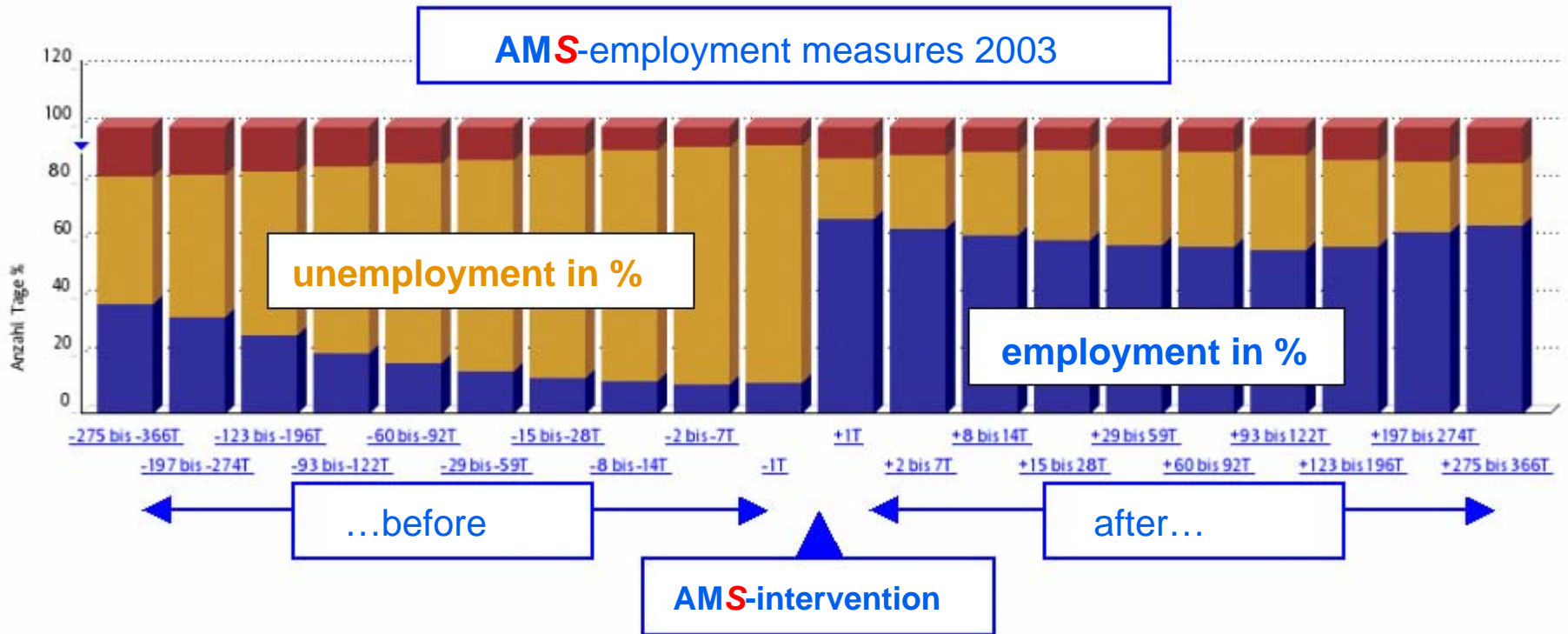
Results can be differentiated according to the following ‚dimensions‘:

- personal dimensions:
 - e.g. sex, age, nationality, educational attainment, disability, occupation,...
- measure-related dimensions:
 - e.g. type of (ALMP-)measure, date, region, code of termination,...
- career-related dimensions:
 - e.g. ex ante / ex post period, main indicator, HV status, PES status, NACE, size of employer,...

Highlight: Monitoring / follow-up (example)



Highlight: Monitoring / follow-up (example)



Highlight: Monitoring



Is it worth the money?

Comparison of

- Costs of the Monitoring-project:
 - **Development (2000-04):** 1.3 mill. €
 - **maintenance:** 20,000 €p.a.
 - **indirect costs:** hardware, AMS-staff,...?

- ALMP - budget (Follow-up monitoring)
 - **approx. 850 million €p.a.**
 - 1 % = 8 million €p.a.

General results / Scope

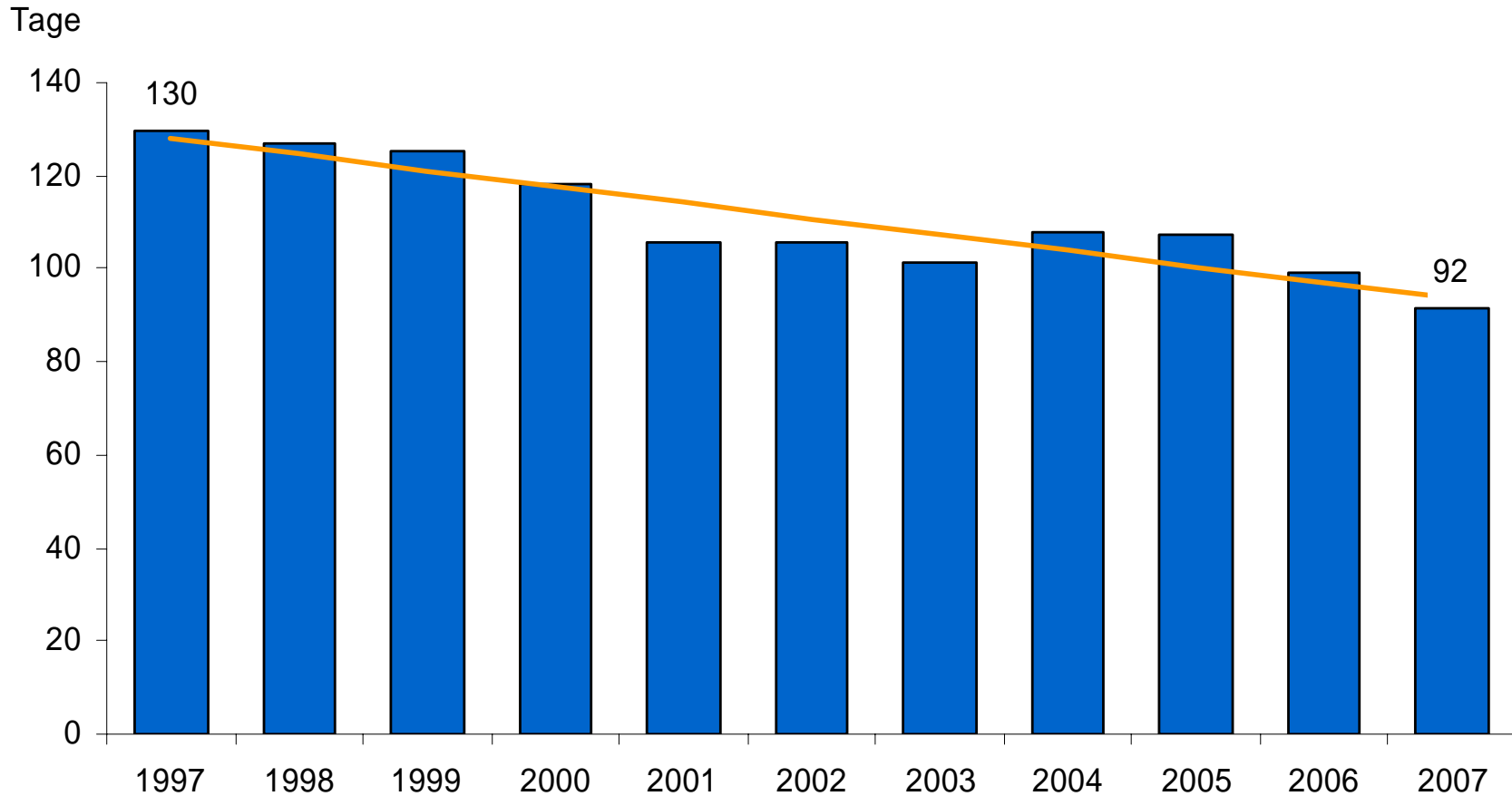


- New concepts (process instead of stock, LZBL = long-term-joblessness) including feedback to operational systems
- 2nd place at international benchmarking project of 13 european PES (1st place Finland)
- effectivity measurement (Monitoring): according to EU PEER REVIEW PROGRAMME AUSTRIA 2004 „**vanguard of this development**„
- Improved and more efficient reporting: 3 days instead of 3 weeks, 3 hours instead of 3 days, ...
- Arbeitsmarktdatenbank (AM-DB): unified basis for research institutions - now focus on research instead of data extraction
- Greater independence from external partners
- **Change of attitude facing new questions**

BI: benchmarking & transparency



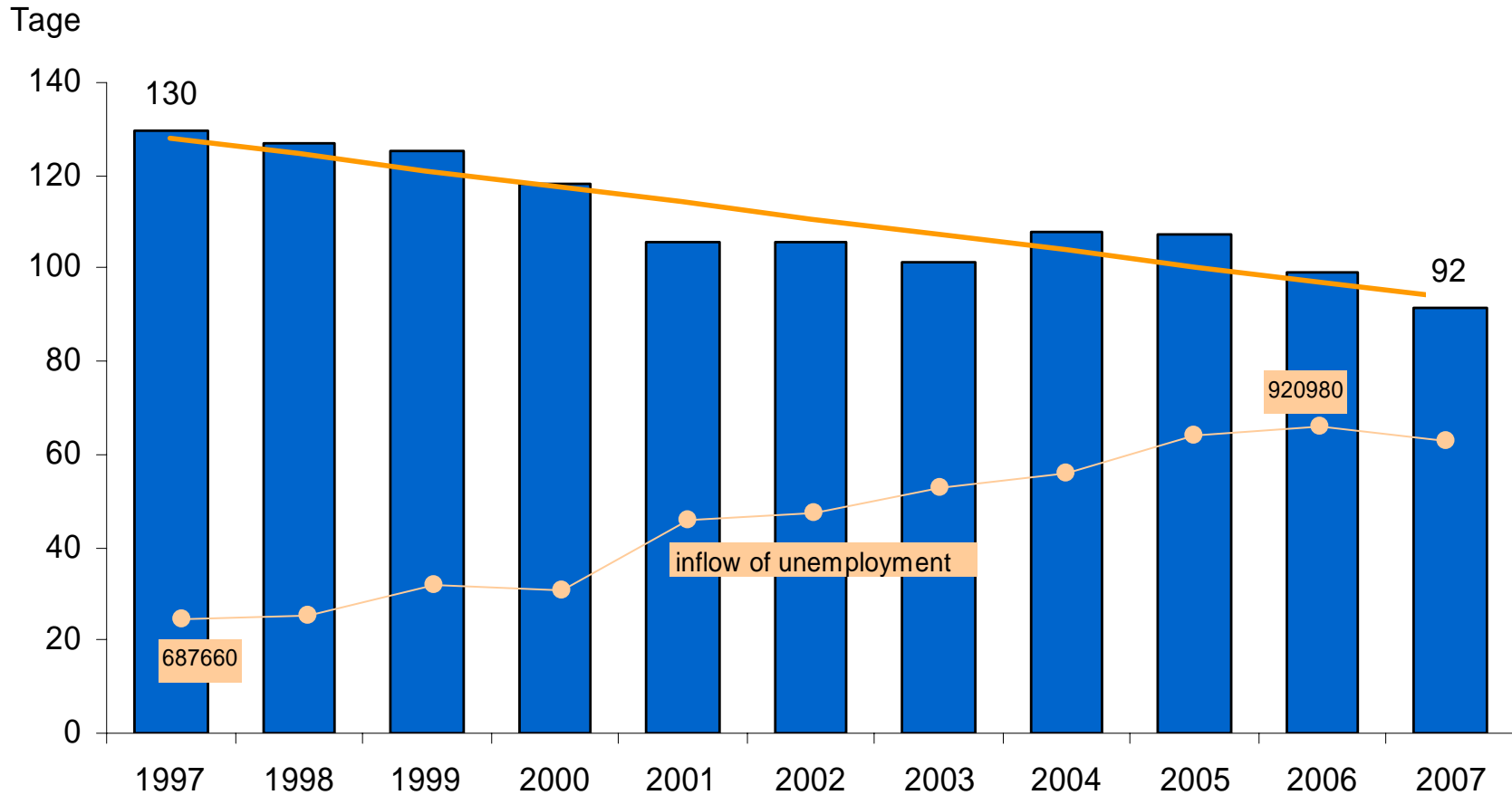
mean duration of unemployment decreased by 29% since 1997



BI: benchmarking & transparency



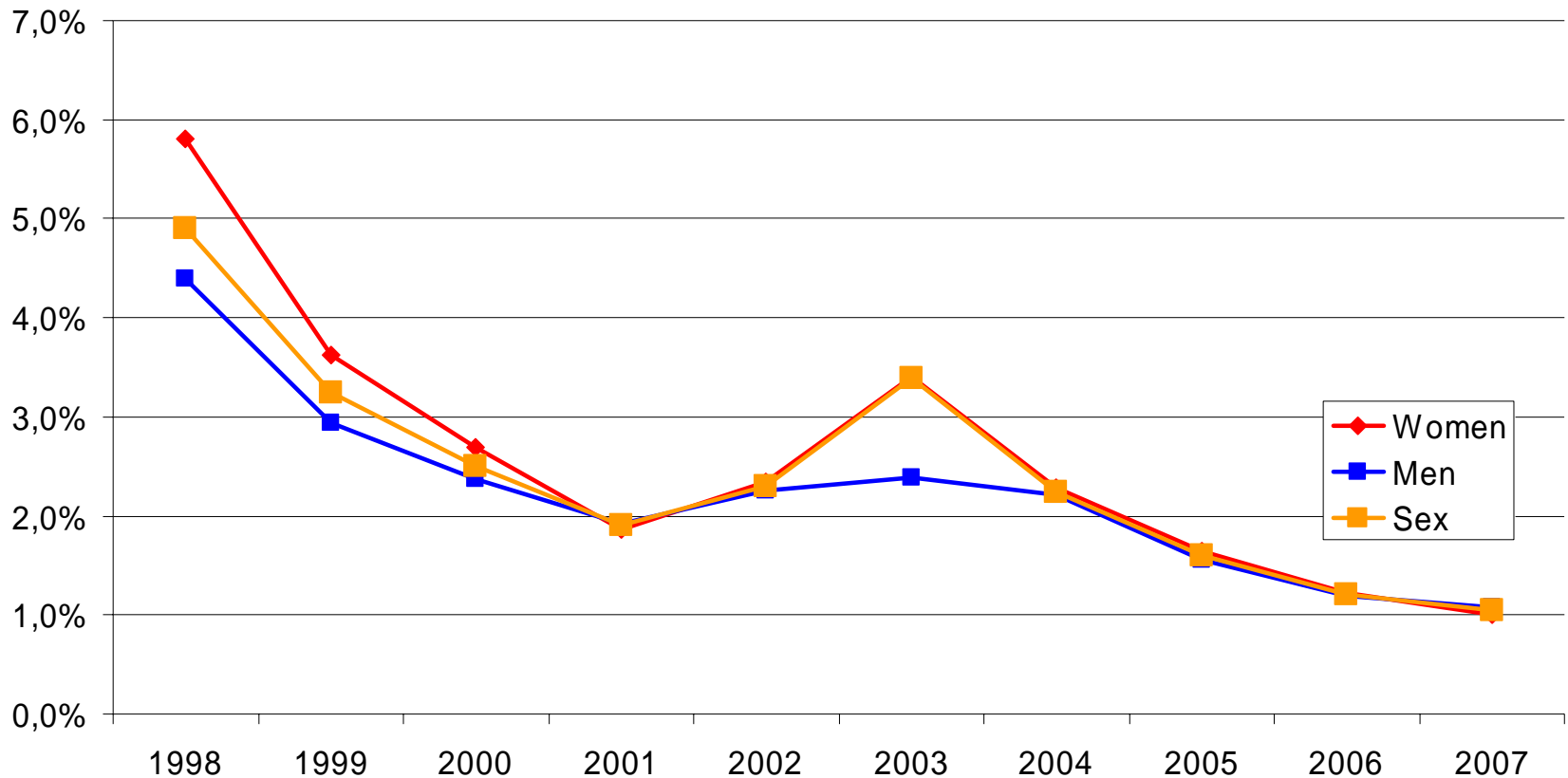
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BI: benchmarking & transparency



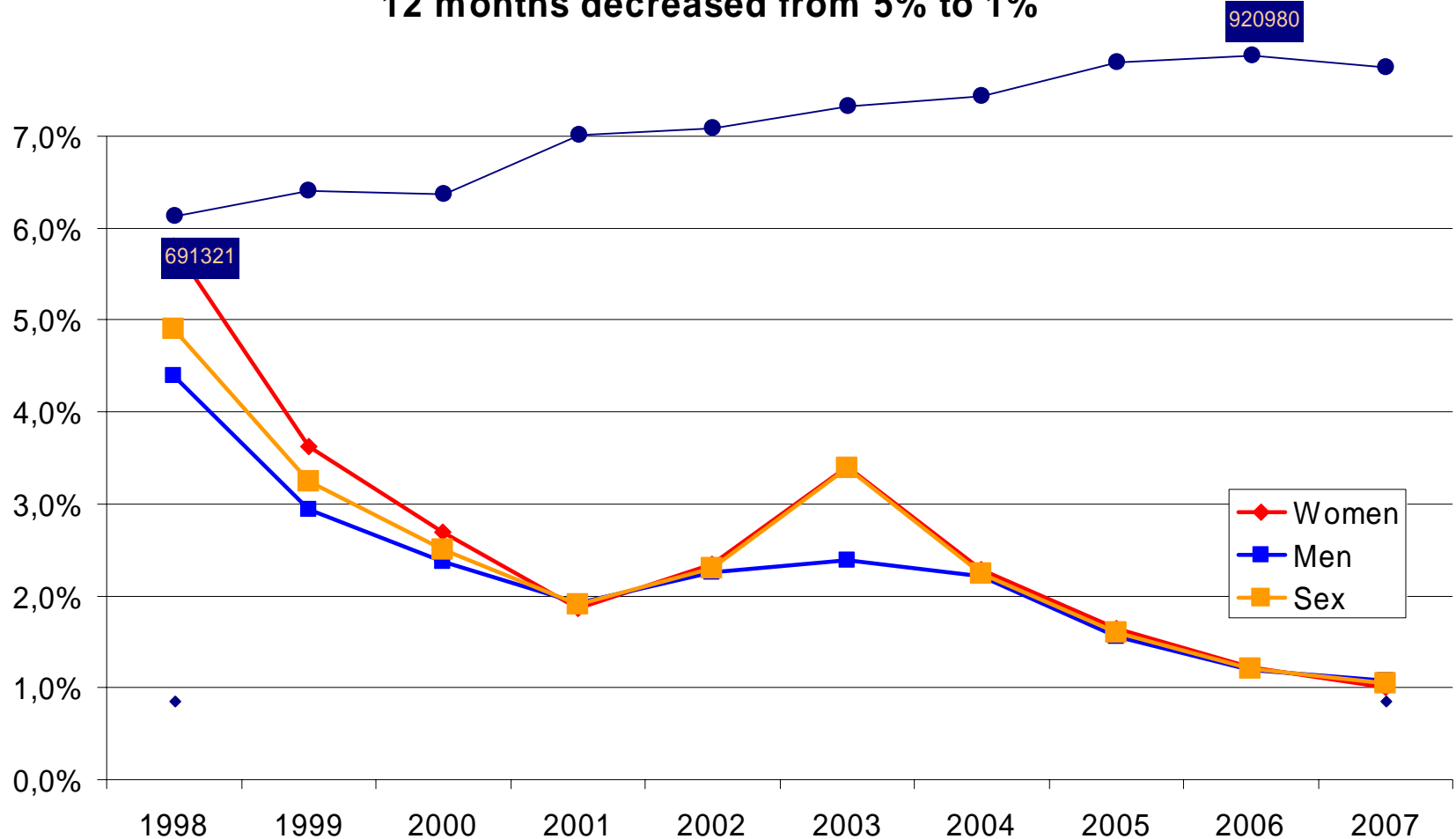
Percentage of persons with unemployment duration greater than 12 months decreased from 5% to 1%



BI: benchmarking & transparency



Percentage of persons with unemployment duration greater than 12 months decreased from 5% to 1%



How done?



- Organization:
 - coordination by IT (e.g., reporting to the CIO)
 - pushed by departments
 - technical work **Siemens and Siemens-daughter amsbg => Service Level Agreements (SLAs)** – depending e.g. on number of users
 - our SLAs result in approx. 3-4 year cycle for change of servers
 - average: 10 persons out-sourced, 5-10 AMS, 5 in „BICC“
- State of the art-SW (Front-end: **Cognos 8 BI**): 100% Web in alignment with our IT-strategy
- Think BIG - start small: starting with important questions, e.g. LMP, and improve:
 - 1998: pilot-project LMP-targets in the DWH
 - 1999: every AMS-employee can via Intranet see the LMP-target-data, can compare („private benchmarking“)
 - since 2000, „drill-through“ to the relevant cases in detail
 - starting 2003: single-user-view (e.g., unemployed persons an AMS-user is responsible for)

How done? - Organization / „Virtual BICC“



- Within an environment of IT-outsourcing this means
 - Technology related problems: **OUT**
 - Business related questions: **IN**

- No single department for BI, but:
persons from different departments (plus BMWA=ministry for labour)
plus Siemens act as if in a BICC
 - 6 people AMS / BMWA (ministry of labour)
 - 5 people Siemens/amsbg
 - therefore 'virtual' BICC

- BICC-members are experts, have knowledge:
 - counselling – especially for new projects; training; even 1st level support
 - safety net
 - interface to external partners
 - experts for expert questions of the management / strategy

How done? – Technical data



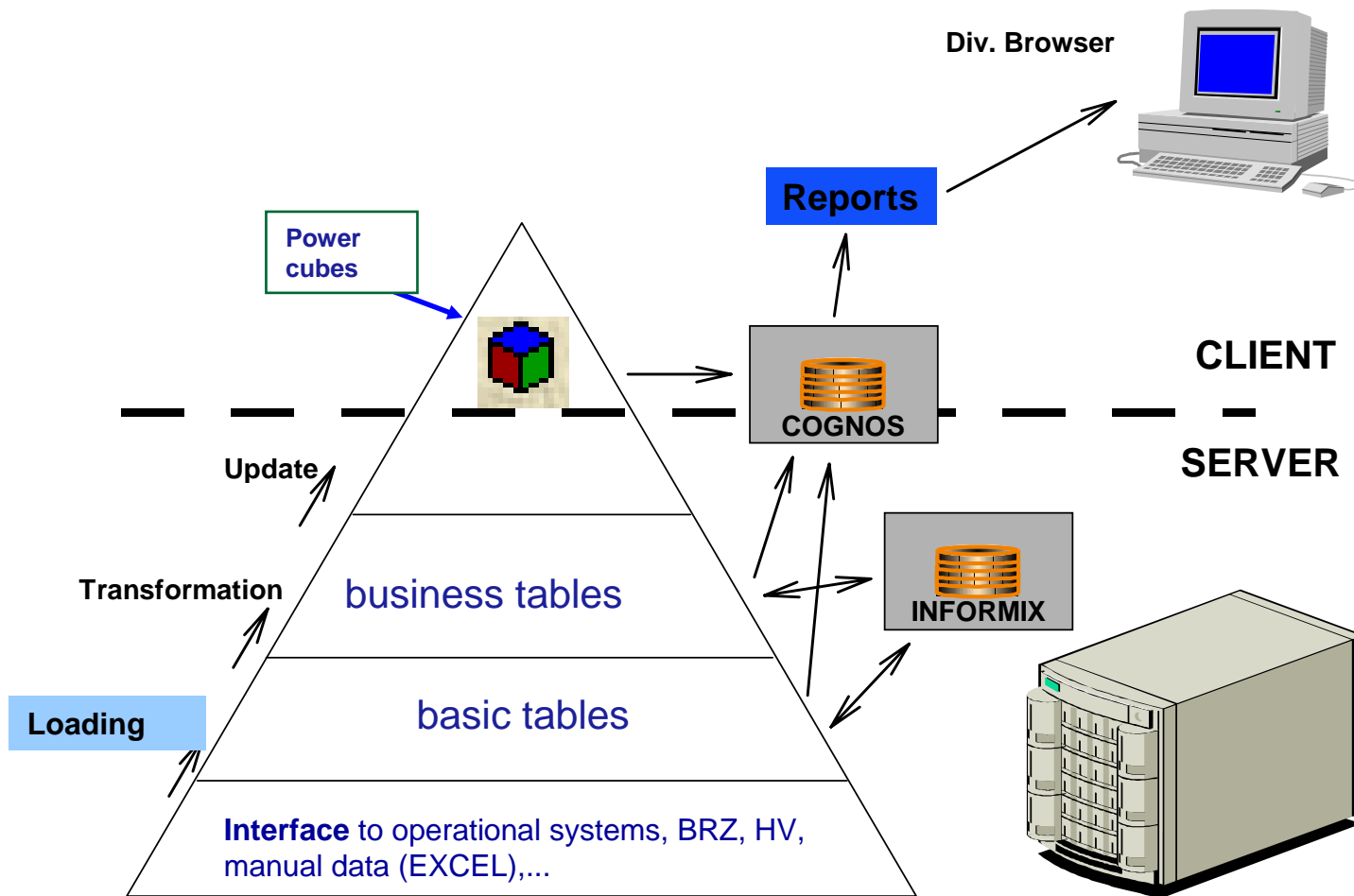
Concentration on OLAP („cubes“)

- Enterprise licence for OLAP (5000 users Cognos 8 / Analysis Studio)
- 1000 regular users / year and
- 300 frequent users access
 - 800 cubes (on 310 different models)
 - 20 cubes with daily update
 - 25 cubes > 10 GB, 3 cubes > 15 GB
- 1200 tables, 800 stored procedures = 240000 lines of code
- Job-control (800 jobs) + AQUAS = Automatic Quality Control
- 1 Terabyte storage

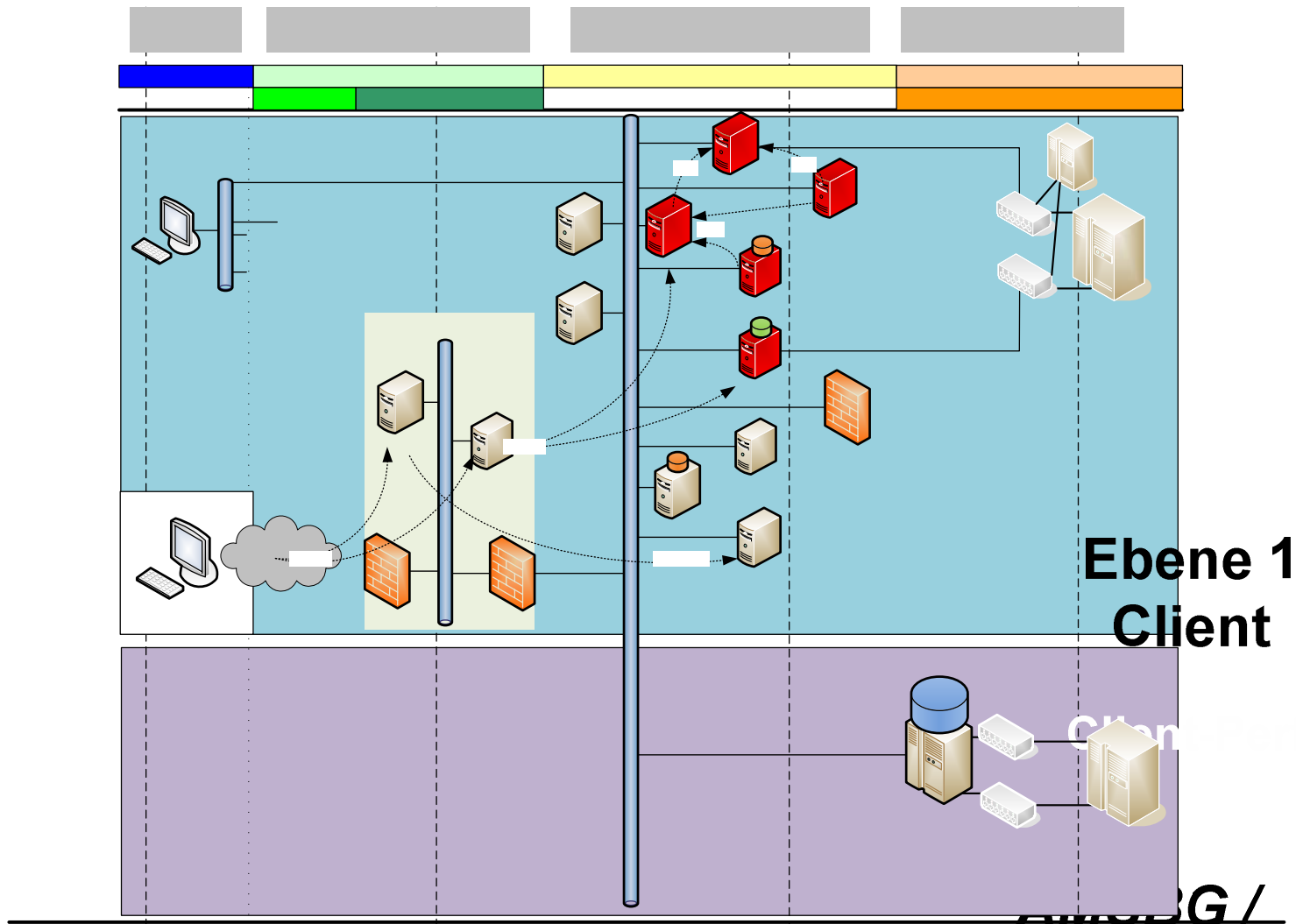
100 power-users (e.g. relational queries using Cognos 8 Query- and Report-Studio)

3% of IT-budget for BI

Configuration / System: „structural view“



Configuration / System: „schematic details“



**Ebene 1
Client**

Client

FE-E

AMS/

Primary-Site

Configuration / System: details



- Database-server:
 - 4 dual-core-CPU's (FSC M9000-partition)
 - 64 GB RAM
 - Operating system: SUN-Solaris 10

- Database: Informix 9.40, 64-bit

- Application-Tiers:
 - 2 LINUX C8-application servers, each with
 - 4 dual core-Intel-processors (dwhpaf01.ams.or.at und dwhpaf02.ams.or.at)
 - 12GB RAM
 - Operating system: Redhat-LINUX
 - C8-Content-Store – server (dwhpbdb1.ams.or.at)
 - Intel XEON CPU
 - 12GB RAM
 - Operating system: Windows 2003 Server
 - Database: MS-SQL-Server 2005

- Arbeitsmarktdatenbank (AM-DB: pamdb.ams.or.at):
 - 4 Dual-Core AMD-Opteron-CPU's
 - 2.6 GHz / 16 GB RAM
 - Operating system: Windows Server 2003.
 - database: DB2

- **Approx. 3-4 year – cycle for change of servers**

Lessons learned



- **Step by step**
 - pilot project(s) - quick results (especially at the beginning)
 - learning by doing
 - allow time to get accustomed to the data (it's „news“, even to the experts!)

- **Right kind of persons ...personal involvement!**

- **Create options for the future** (e.g., data mining)
- Executive sponsorship (money!)
- Constant information of stakeholder (staff, management, ...)
 - by members of the BICC

We thrive in information-thick worlds because of our marvelous and everyday capacities to select, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeonhole, pickover, sort, integrate, blend, inspect, filter, lump, skip, smooth, chunk, average, approximate, cluster, aggregate, outline, summarize, itemize, review, dip into, flip through, browse, glance into, leaf through, skim, refine, enumerate, glean, synopsise, winnow the wheat from the chaff, and separate the sheep from the goats.

Edward Rolf Tufte, "Envisioning Information")