

NUS Journey towards BI Implementation in line with SAP Roadmap

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BI for Decision Making

Business Intelligence support for
decision making

**Identify
Symptoms**

**Identify
Major
Issues**

**Identify
Major
Drivers**

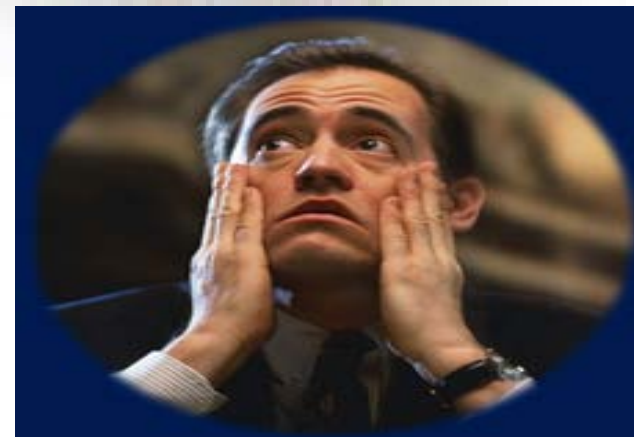
**Determine
Actions**

**Categorize
Actions**

**Attack &
eliminate
Issues .**

Issues & Concerns for Management

- Where is my information - I find data sheets all over my place !!
- Should I be mining on my reports for making critical decisions ?
- Should I be looking into several systems for making my decisions
- Why is there a talk about programming every time I ask for a change in report ?
- Can I have all my reports and KPIs from a single screen ?
- Should I continue using Excel ?



The Value of BI

- Completeness
End-to-end BI solution incorporating data warehousing, OLAP, data mining, business intelligence tools and pre-defined business content.
- Openness
Allows to incorporate data from heterogeneous systems.
- Business Orientation
Integrates business processes. Provides a centralized metadata repository with a consistent business semantic. Ready-to go templates and best-practices – horizontal and vertical business content.
- Actionable Information
Supports decision-making requirements of every user.

Vision and Mission

Vision

To have ONE version of official information

Mission

1. To build a Data Warehouse to hold integrated institutional information needed for decision making and monitoring purposes.
2. To have a Data Management Policy to manage institutional data to ensure data reliability, accuracy, security and accessibility.

BI Objectives for NUS



➤ Objective :

The University Business Warehouse is an integrated central database of official information. It makes available relevant key data to support senior management, faculties and departments in situational awareness, trend analysis, decision making and monitoring of progress.

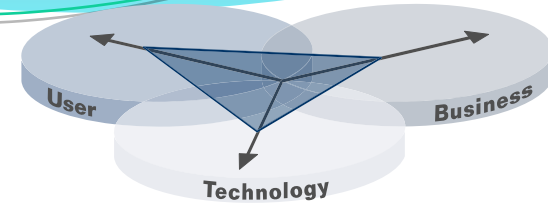
➤ Key elements/features:

The Business Warehouse is built on a central infrastructure and it is web-based. It can be accessed via the staff intranet portal anywhere anytime.

The warehouse can cater to information needs at different levels. These include users who just want to view reports; users who want to dice and slice the information further and those who will build information queries themselves.

Today, the warehouse draws derived data and historical records from various information sources covering students, research, finance, admission, halls of residence, human resource and enterprise.

Key Areas addressed with BI



➤ Openness

- DB Connect – directly access data to relational database tables and OLAP systems
- Support of industry standards (e.g. XML, XML for Analysis, JDBC etc.)

➤ Integration

- Integration of applications allowing cross-enterprise analytics and closed-loop scenarios
- Integration into the Enterprise Portal as single point of entry
- Integration of unstructured information such as documents, files, etc.

➤ Web Offering

- Interactive analysis of information via web and mobile devices
- Intuitive design of web applications
- Ad-hoc query design via the web

➤ Advanced Reporting & Analysis

- Multidimensional reporting

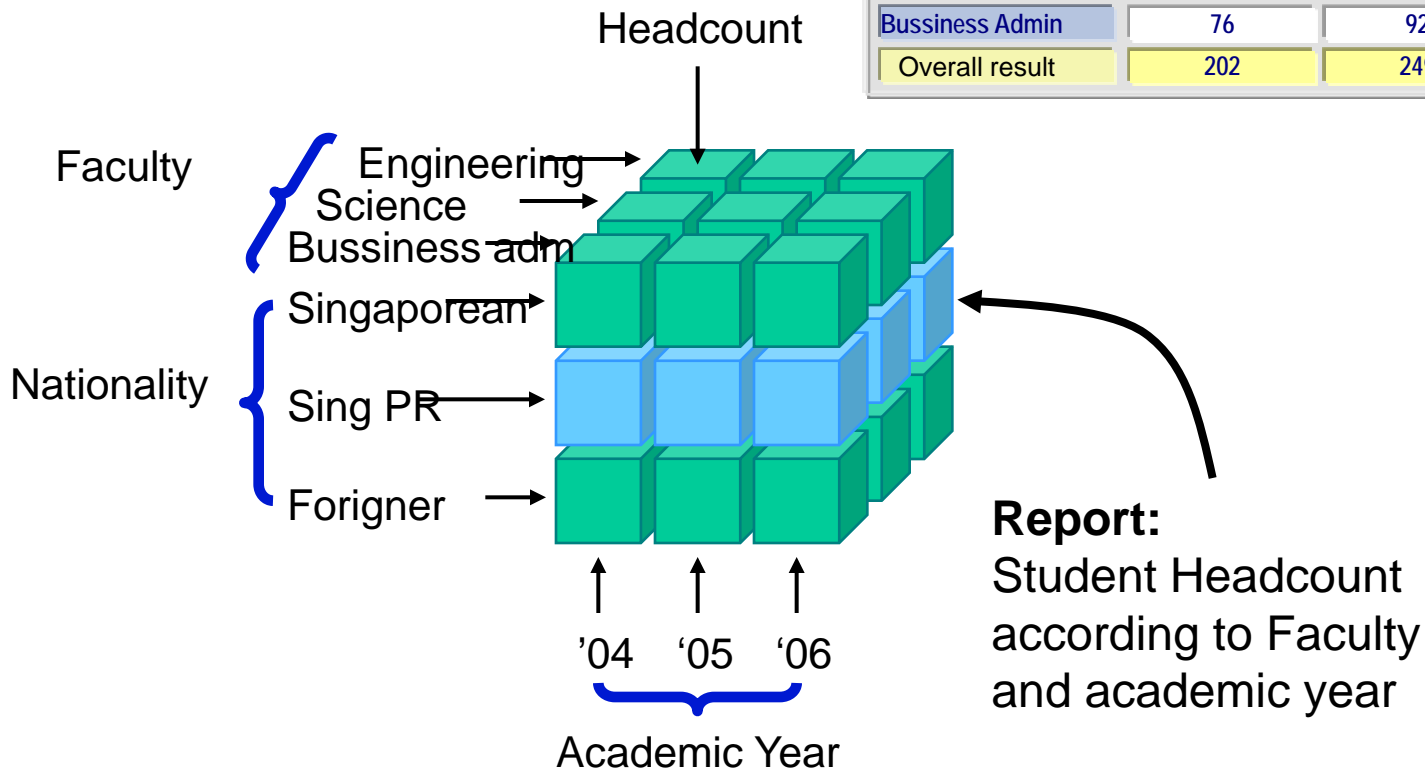
➤ Consolidation of information

➤ Improve OLTP Performance- Relief for reporting from R/3-System

Multi-dimensional Reporting

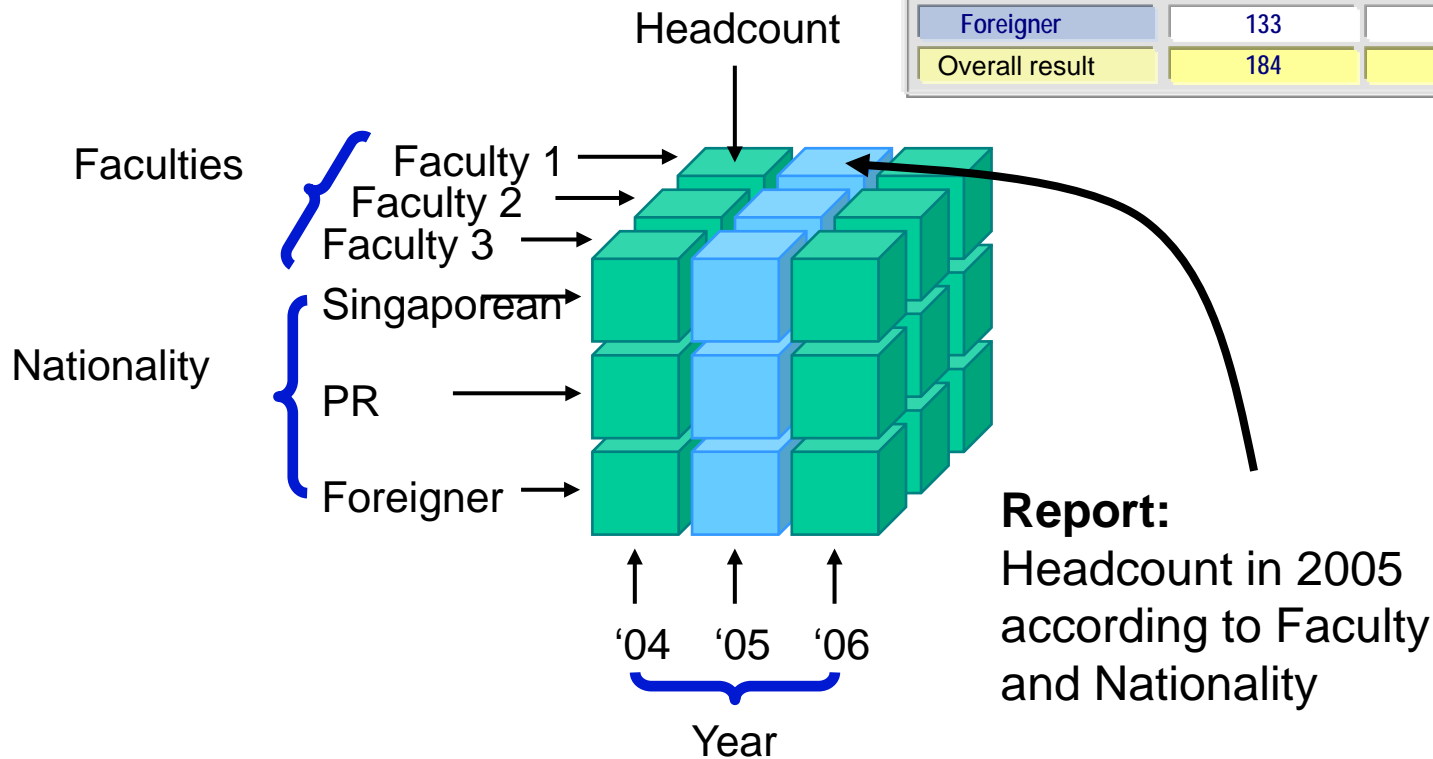
View #1

Headcount			
	HC	HC	HC
	2004	2005	2006
Engineering	24	43	64
Science	102	114	149
Bussiness Admin	76	92	98
Overall result	202	249	311



Multi-dimensional Reporting

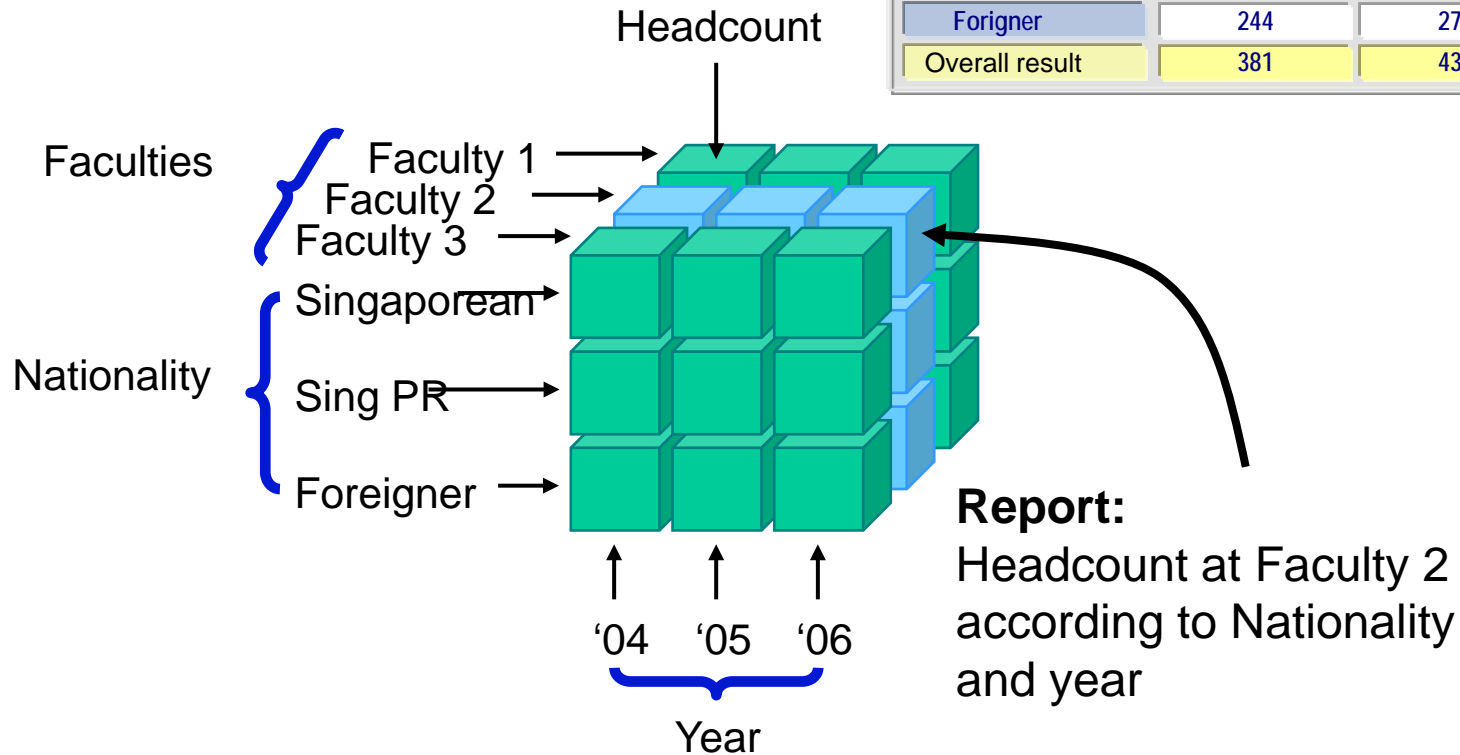
View #2



Headcount			
	Faculty 1	Faculty 2	Faculty 3
Nationality	2004	2005	2006
Singaporean	8	48	12
Singapore PR	43	114	92
Foreigner	133	272	148
Overall result	184	434	252

Multi-dimensional Reporting

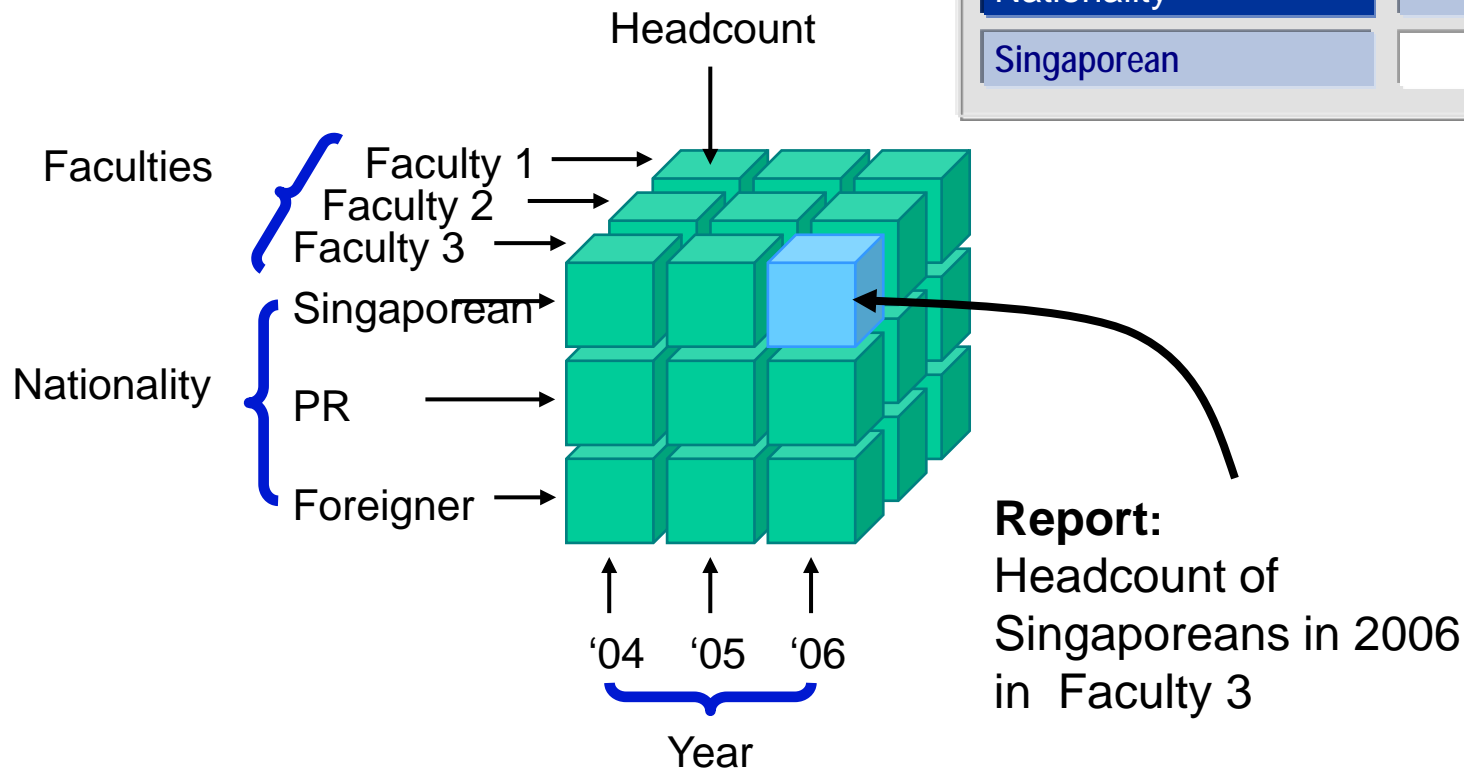
View #3



Headcount			
	Faculty 2	Faculty 2	Faculty 2
Nationality	1996	1997	1998
Singaporean	35	48	57
Singapore PR	102	114	149
Forigner	244	272	314
Overall result	381	434	520

Multi-dimensional Reporting

Restricted view

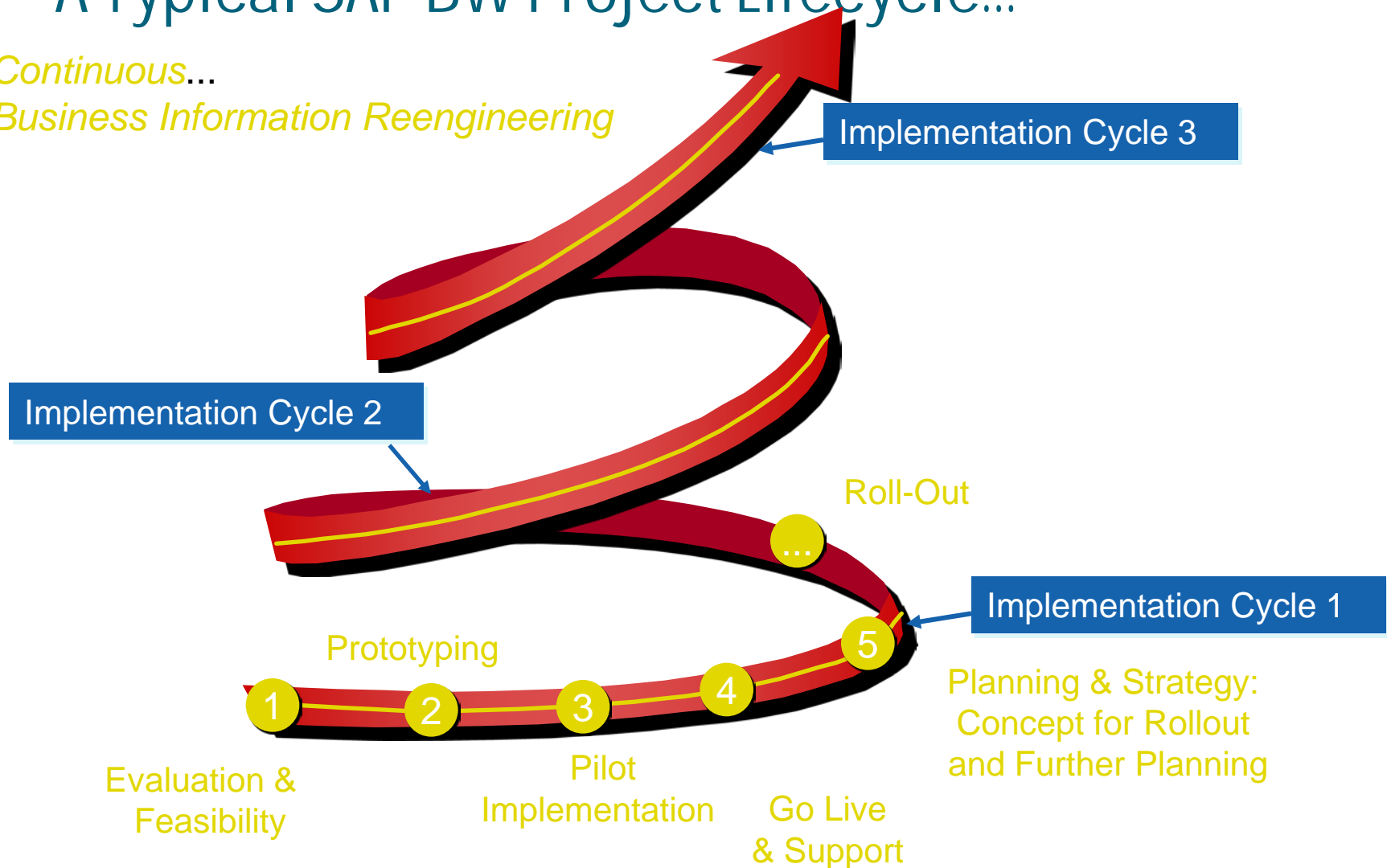


Headcount	
	Faculty 3
Nationality	2006
Singaporean	14

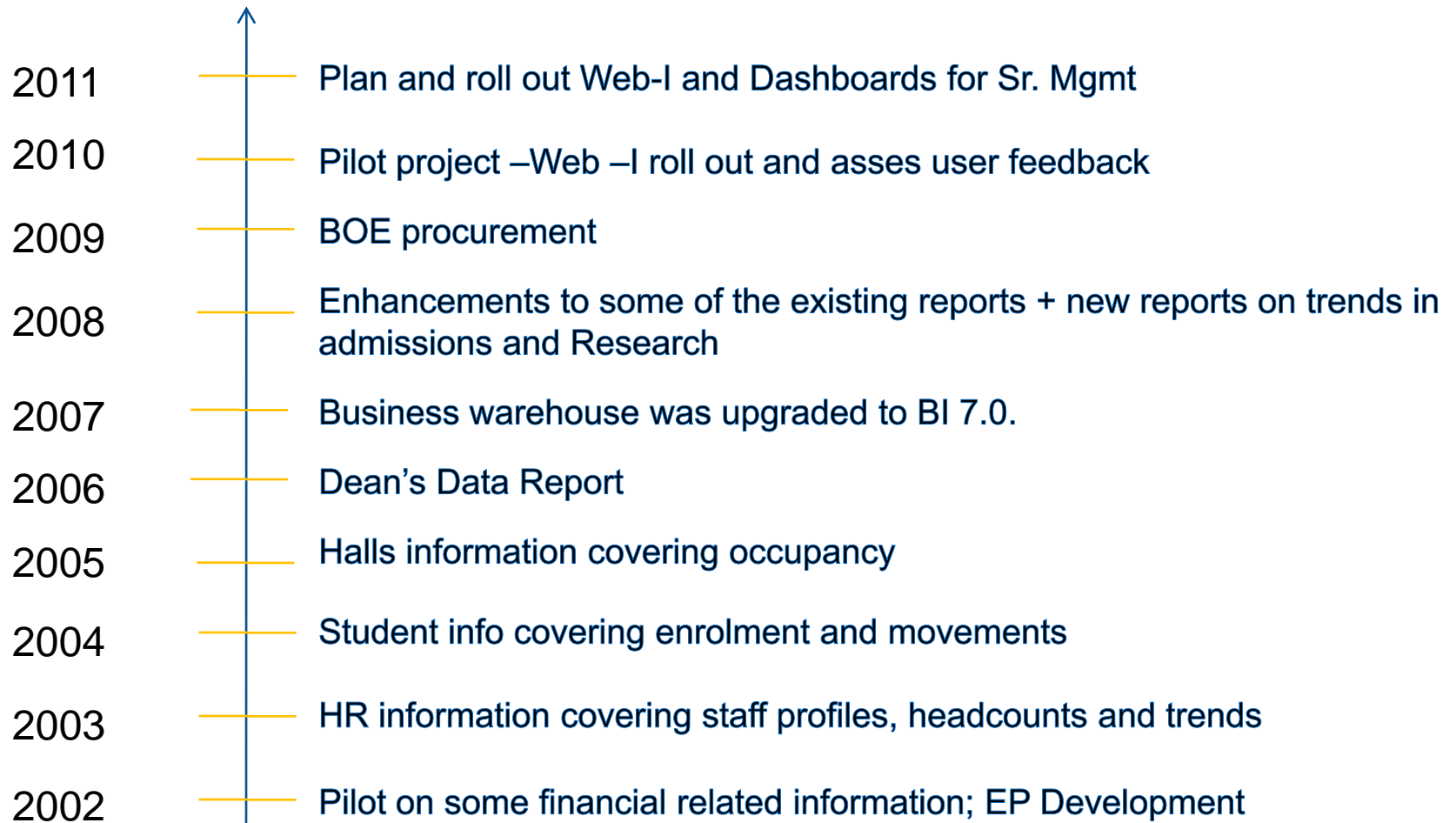
A Typical SAP BW Project Lifecycle...

Continuous...

Business Information Reengineering



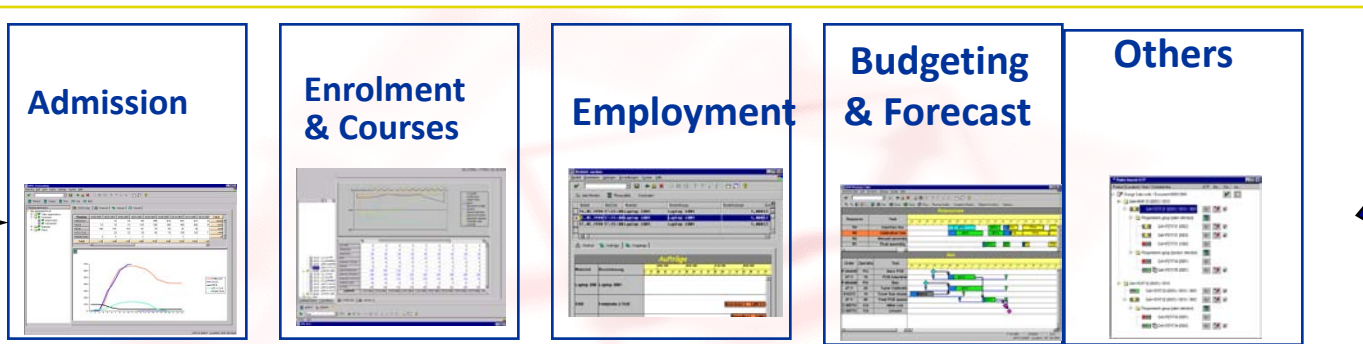
BI evolution in NUS



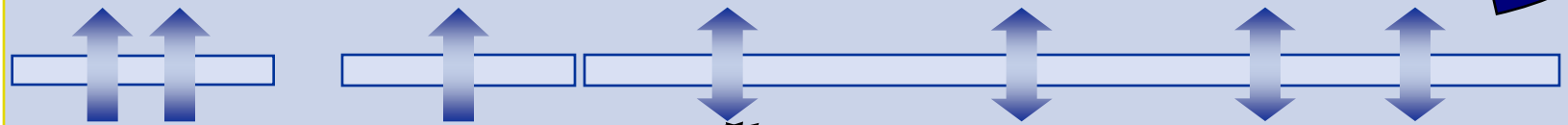
BI at NUS



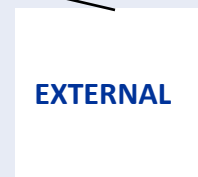
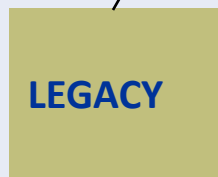
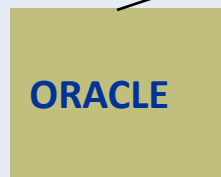
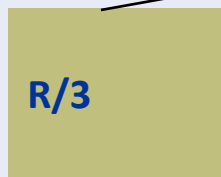
Enterprise wide information



SINGLE VERSION OF ENTERPRISE INFORMATION



OLTP



Benefits of BI at NUS

- The development of the warehouse is evolving. The information coverage in the warehouse is expanding and many queries are cross information areas. In the process of using the warehouse, some of the source systems are enhanced and the source data are made more accurate.
- The business warehouse has achieved one version of truth as all official information will be drawn from it and therefore ensuring information consistency.
- The warehouse has helped to increase efficiency in generating required information to handle ad-hoc queries and has empowered users to be able to navigate and arrive at information required themselves without the help of a technical developer.
- The warehouse will be a very useful platform to management when more information is included and a dash board can be implemented for them to view at a glance the alerts they need to pay attention to.

NUS BI Scenarios- Some Sample BW Report

SAP Enterprise Portal 5.0 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Mail My Yahoo! Games Personals Music Finance Sign In

Address http://iodine.intranet.nus.edu.sg/SAPPORTAL/ Go Links

NUS National University of Singapore *myNUS* your personalised portal Welcome Pratap PALACHARLA

HOME Corporate Resources & Services Staff Matters Academic Matters Customise Comp. Centre BI MIS Portal Admin Content Admin Portal Monitoring System Configuration Support International

myReports

- ▶ All Portal related BW role-templates
- ▶ BW - Portal Interface Administrative
- ▶ BW Statistics: All
- ▶ Demo Web Applications
 - ▼ Staff Statistics
 - Staff Strength by Faculty
 - Web Items
 - Staff Analysis
 - ▼ Student Statistics
 - HC: Cohort Graduation Tracing
 - Faculty Enrolment %
 - UG Student Enrolment
 - UG student Movement %
 - UG Student Enrolment Statistics
 - UG Student Enrolment Trend -
 - ▶ HMS General Queries
 - ▶ HR PA: General Queries (OHR)
 - ▶ RO Demo Library
 - ▶ UG General Queries
 - ▶ UG Key Figure Analysis

Cohort Tracing

Student Type	U
Cohort	2003

Navigation Block

Academic Year (YYYY)			
Course Code			
Degree			
Faculty (RO)			
Full Time /Part Time			
Student ID No			
Cohort Trace			

Faculty (RO)	No of Students	Graduates <= 2006	% Grads <= 3 years	Graduates 2007	% Grads 4 years	Graduates 2008	% Grads 5 years	Graduates >= 2009
FASS	1,510		0.00 %		0.00 %		0.00 %	
FOS	1,450		0.00 %		0.00 %		0.00 %	
LAW	220		0.00 %		0.00 %		0.00 %	
FOE	1,663		0.00 %		0.00 %		0.00 %	
SOC	515		0.00 %		0.00 %		0.00 %	
YSTC	71		0.00 %		0.00 %		0.00 %	
SDE	415	2	0.48 %		0.00 %		0.00 %	
BIZ	368		0.00 %		0.00 %		0.00 %	
Overall Result	6,212	2	0.03 %		0.00 %		0.00 %	

Some Sample BW Report..



myNUS STAFF PORTAL

myNUS Staff Portal
BI
myReports
myReports

- BW Statistics: All
 - Usage Statistics
 - Data Load Statistics
 - Performance
- UG General Queries
 - Official Statistics: Enrolment General Query
 - Official Statistics: Graduates General Query
 - Official Statistics: Intake General Query
 - Module: General Query
 - Operational Data: General Query
- UG Key Figure Analysis
 - Official Statistics: UG Student Enrolment Headcount
 - Official Statistics: UG Graduate Student Headcount
 - Official Statistics: UG Student Intake Headcount
 - Module Registration Analysis
 - Movement Analysis
 - Official Statistics: Graduate Analysis

Official Statistics: UG Student Intake Headcount

Academic Year	2007/2008	
Data Set	Intake	
Semester (of Data load)	Semester 1	
Data Frozen Date	04.09.2007	

Navigation Block


Course Code				
Course Defunct Indicator				
Degree				
Ethnic Group				
Faculty		ARTS & SOCIAL SCIENCES, SCIENCE, SCHOOL OF DESIGN AND ENVIRONMENT		
Full Time /Part Time				
Gender				
Student Status				
Key Figures		No of Registrations		

Faculty	Course Code	Degree	Gender	No of Registrations		
				FEMALE	MALE	Overall Result
FASS	ARTS AND SOCIAL SCIENCES 1	B.A.		1,162	452	1,614
FOS	APPLIED SCIENCE 1	B. APPL. SCI.		1		1
	PHARMACY 1	B.SC.(PHARM.)		87	29	116
	SCIENCE 1	B.SC.		698	430	1,128
SDE	ARCHITECTURE 1	B.A.(ARCH)		96	66	162
	ARCHITECTURE 3	B.A.(ARCH)		2		2
	ARCHITECTURE 4	B.A.(ARCH)		1		1
	INDUSTRIAL DESIGN 1	B.A. (I.D.)		28	10	38
	PFM1	B.SC. (PROJECT & FACLT. MGT.)		109	25	134
	RST1	B.SC. (REAL ESTATE)		105	49	154
Overall Result				2,289	1,061	3,350

NUS BI Scenarios – Student Enrolment Analysis

iView Runtime for Java [SAPApplication.BWReport] - Microsoft Internet Explorer

- ▶ All Portal related BW role-templates
- ▶ BW - Portal Interface Administrative Role
- ▶ BW Statistics: All
- ▶ Demo Web Applications
- ▶ HMS General Queries
- ▶ HR PA: General Queries (OHR)
- ▶ RO Demo Library
- ▶ UG General Queries
- ▼ UG Key Figure Analysis
 - Module Registration Analysis
 - Movement Analysis
 - Official Statistics: I / E / G Student Headcount
 - Official Statistics: Graduate Analysis



Official Statistics: UG Headcount

Academic Year	2003/2004
Data Set	Enrolment
Status of Data	06.12.2004 13:19:57

Navigation Block

Course Code		
Course Defunct Indicator		
Degree		
Ethnic Group		
Faculty		
Full Time /Part Time		
Gender		
Student Status		
Key Figures	No of Registrations, Avg. Age	

Faculty	Degree	Course Code	Gender	No of Registrations			Avg. Age		
				Female	Male	Overall Result	Female	Male	Overall Result
FASS	B.A.	ARS1		1,191	481	1,672	19	21	20
		ARS2		1,135	428	1,563	20	22	21
		ARS3		972	378	1,350	21	23	22
		Result		3,298	1,287	4,585	20	22	21
	B.A.(HONS.)	ARS4		133	59	192	22	24	23
		Result		133	59	192	22	24	23
	B.SOC.SCI.(HONS.)	SOC4		218	112	330	22	24	23
		Result		218	112	330	22	24	23
	Result			3,649	1,458	5,107	20	22	21
FOS	B.SC.	SCI1		898	412	1,310	19	21	20
		SCI2		674	375	1,049	20	22	21
		SCI3		734	368	1,102	21	23	22
		SCI4		5	14	19	22	24	23
		Result		2,311	1,169	3,480	20	22	21
	B.SC.(HONS.)	SCI4		119	93	212	22	24	23
		Result		119	93	212	22	24	23
	B.SC.(PHARM.)	PMC1		66	19	85	19	21	20
		Result		66	19	85	19	21	20
	B.SC.(PHARM.)(HONS.)	PMC1			1	1	22		22
		PMC2		60	24	84	20	22	21
		PMC3		69	15	84	21	22	22
		PMC4		78	13	91	22	24	23
		Result		207	53	260	21	23	22
	B. APPL. SCI.	ASC1		58	18	76	20	20	20
		ASC2		102	30	132	21	22	21
		ASC3		139	69	208	22	23	22

NUS BI Scenarios – Graduate Analysis

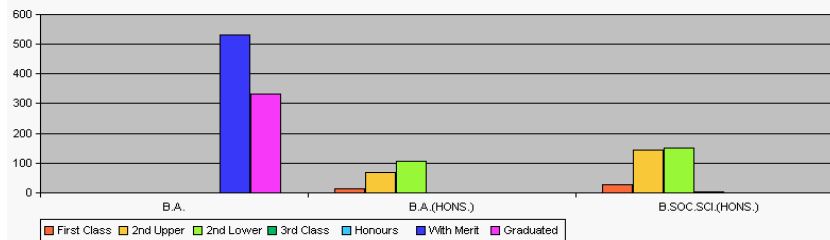
- ▷ All Portal related BW role-templates
- ▷ BW - Portal Interface Administrative Role
- ▷ BW Statistics: All
- ▷ Demo Web Applications
- ▷ HMS General Queries
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 - Movement Analysis
 - Official Statistics: I / E / G Student Headcount
 - Official Statistics: Graduate Analysis



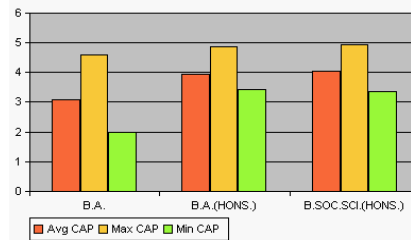
Official Statistics: UG Graduate Analysis

Academic Year	2003/2004
Data Set	Graduates
Status of Data	06.12.2004 13:19:57

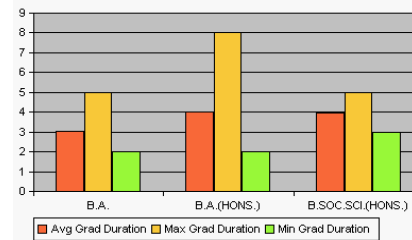
Exam Results



CAP



Graduation Duration



Selected Filter Values

Faculty: ARTS & SOCIAL SCIENCES

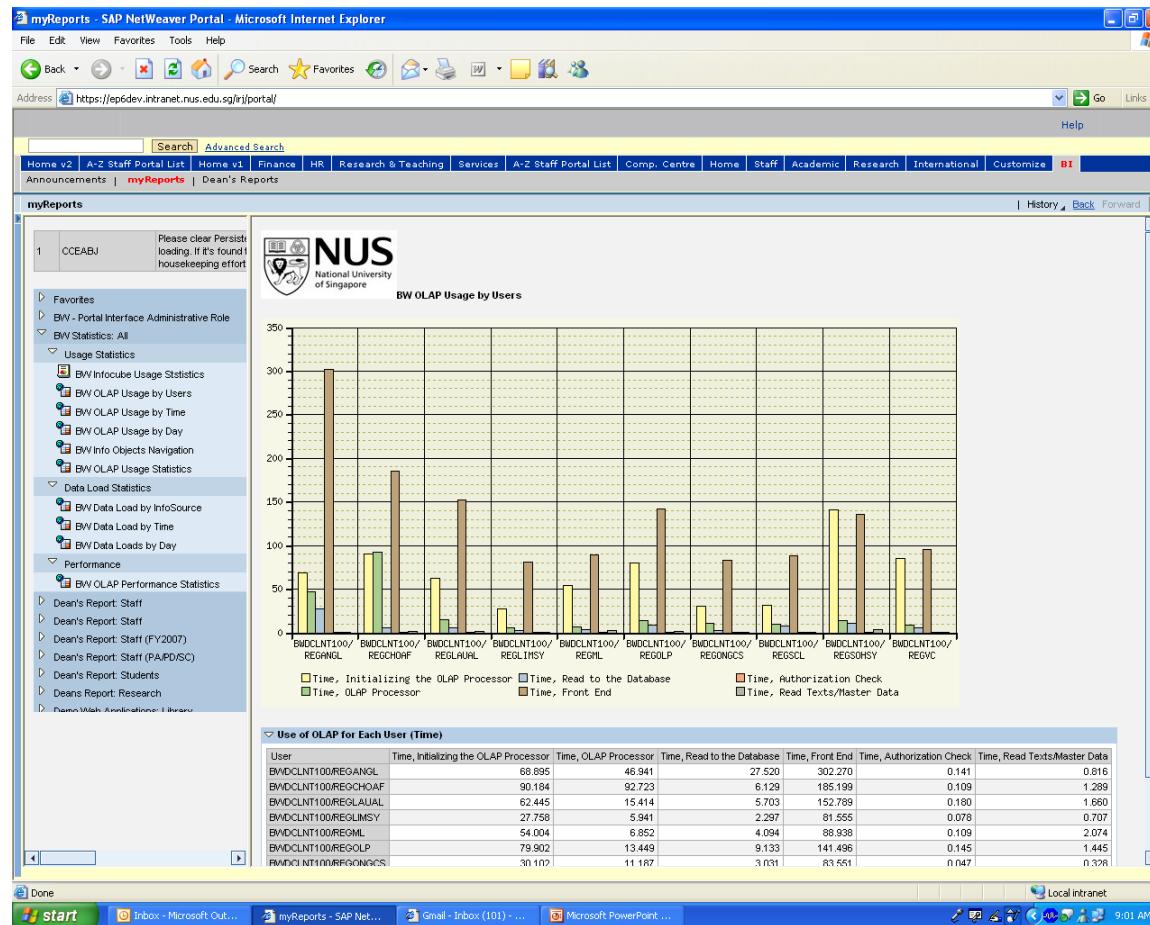
▷ Select Faculty

▷ Select Nationality

▷ Select Gender

▷ Select Full Time / Part-Time

NUS BI Administration- BI usage monitoring

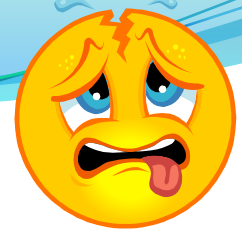


Common challenges of BI implementation

- Fear of Change
- Control & Ownership
- Resources Availability
- Complexity



Challenges of BI implementation contd..



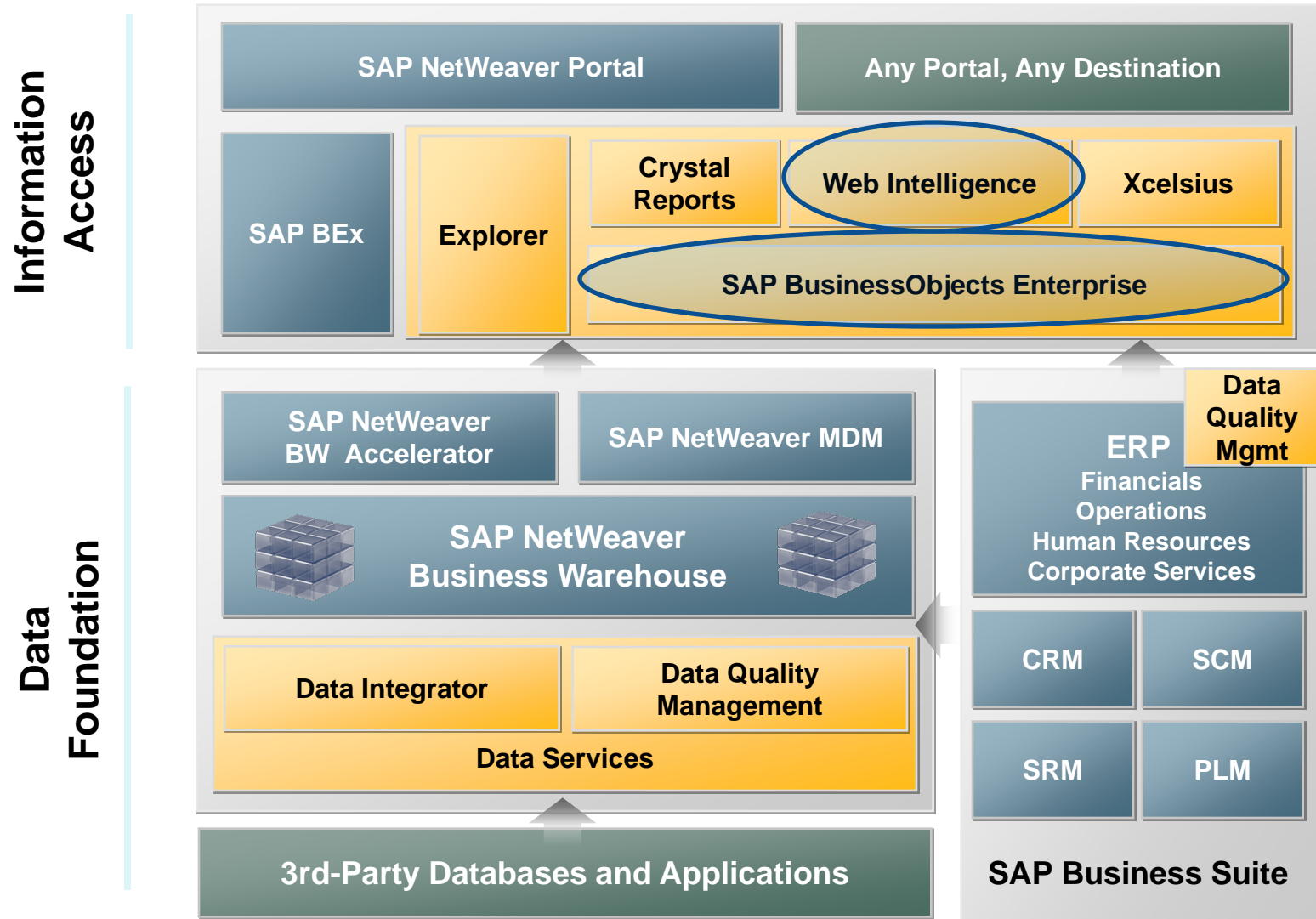
- Most of the times translation of business requirements to BW technical requirements is difficult and hence requires the assistance of techno-functional consultants.
- The other challenge is a need to design reports that are simple yet provide all the necessary information.
- While implementing BW especially for HR, we have to consider security policies more closely.
- Testing issues: In most cases testing cannot be done on a full scale using real data in several implementations, due to data privacy requirements.
- Dynamics: Every time there is a change in the source system adjusting or re-modeling BI is not easy.
- BI is not meant to be used as an operational system (OLTP) and hence many times, the user expectation of having one single report to give all the details is not achievable.
- The process of managing the link between source and BI is very critical; this constraint of dependency would not be there in case of the reporting being done at the source system.

Value creation for business users

- The biggest Return on Investment (ROI) will come from converting the information consumer group into more active users via increased productivity, and also from reducing the work IT must perform to make information consumable.
- In order to increase user productivity, BI tools need to deliver greater forms of richness and reach users beyond static reports so that they can accomplish more through ease-of-use and convenience.
- A richer user experience might include more visualization, interactivity and instant gratification, while more reach should entail relevant information-delivery channels necessary to make BI omnipresent.

The new Business Intelligence Platform

Value added within an SAP landscape



KEY POINTS



Enterprise Reporting	OLAP Analysis	Query Designer	Adhoc Reporting	Dashboard
CRYSTAL REPORTS to be used for Enterprise Reporting	PIONEER to be used for OLAP analysis Replaced Tools - BEx Analyzer BEx Web Analyzer	BEx Query Designer is not affected by the roadmap.	WEBI Web Intelligence to be used for Adhoc Reporting Universe architecture design	Xcelcius + to be used for dashboards. Replaced Tools - Web Application Designer
Crystal Report to be used for highly formatted reporting such as management reports	Pioneer will combine Voyager's intuitive user interface with the powerful OLAP capabilities of today's Bex OLAP tools	All BOBJ tools can or will consume BEx queries either directly (Pioneer, Voyager, Crystal, Xcelcius) or via OLAP universe	Self-service reporting and analysis, autonomy From IT.	Visual Composer will pick-up further Web Application Design features both in the design- as well as in the runtime, in order to support modeling, running & personalization of composites with seamlessly embedded Business Intelligence

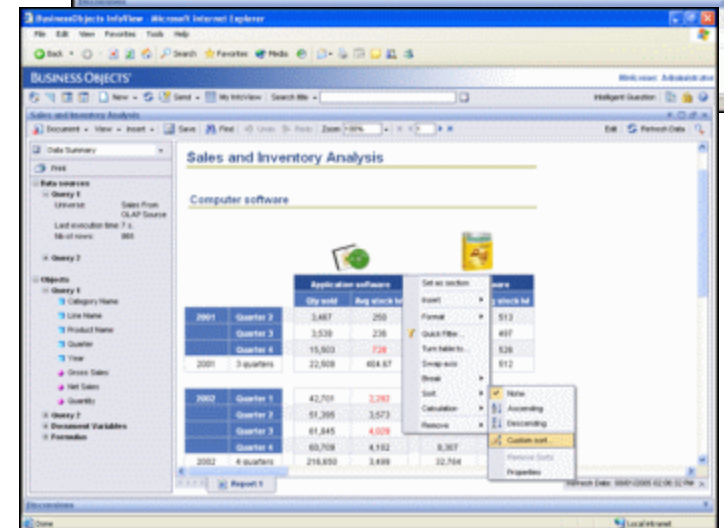
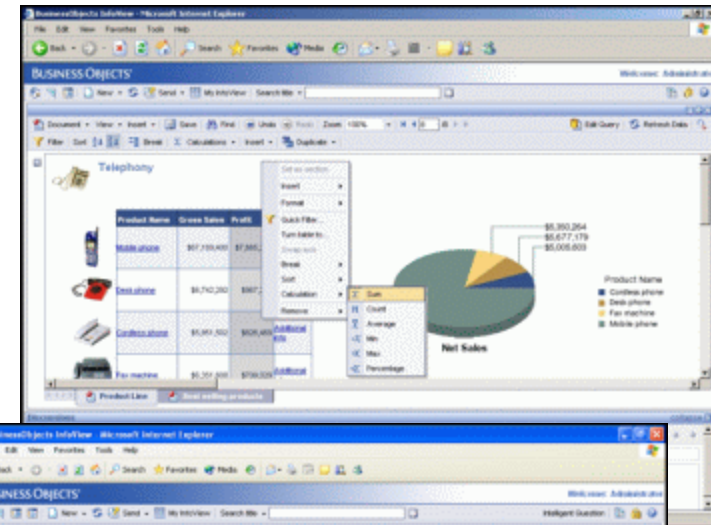
WEB Intelligence -Roll out as a pilot

- Simple user interface
- Combine data from SAP and non SAP in a Single Report
- Sits on top of Business Objects **Universes**.
- Universes connect to SAP Net weaver BI via OLAP BAPI

Enterprise self-service (WEB –I)

Web-based ad hoc reporting and analysis

- On the fly query and analysis- Autonomy from IT!!
- Drag-and-drop interface
- Prompts and wizards
- Seamless transition from querying into analysis
- Drill anywhere – no limits, enable drill through from summary to detail





SELF-SERVICE (AD HOC) DIFFERENTIATORS

- Integrated query and analysis capabilities
- Create a multi-block report and place objects anywhere on the page; Break and section is very useful.
- Apply easy and fast formatting via toolbar- Flexible Formatting like MS office tools!
- Add a calculation directly on the report with the use of Comprehensive formulae like Median, ForEach, ForAll etc



Web Intelligence Demo

- Web Intelligence reports - Demo



Pain Points...

- We are facing a limitation to use one universe for one BEx Query as the query selection is complex and specific
- Web-I does not allow creation of complex selection of RKF as in BEx Query
- User exit variable from BEx query is not supported in Web-I report (Web-I takes the default /Hardcoded value for variable)
- In BEx we can display from master data even though the value is null whereas in Web I the null values for master data is always hidden.
- When we transport the web-I queries from one environment to another, we need to manually change associated universe connection definition to point to the destination environment.
- When we refresh data to fetch data from BW the web-I response time is not good.

Discussion & Feedback



NUS
National University
of Singapore



HERUG
SAP Higher Education & Research User Group

Thank you





Disclaimers:

1. The sample reports presented do not show the actual data, as the reports are extracted from Development Environment.