



Teamcenter

Feature Focus: Teamcenter Reporting

PLM World 2006

May 2006

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UGS



Day:4-Thursday
Time Slot:4-Late Afternoon



- ▶ **TITLE:**
- ▶ Teamcenter Integrations with Business Intelligence and Reporting Tools
- ▶ **ABSTRACT:**
- ▶ This session will outline the capabilities of the Teamcenter Reporting Framework; the scenarios that warrant commercial 3rd party Business Intelligence and Reporting tools and mechanisms for integrating such tools with Teamcenter. The session will conclude with a case study of SQL Server Reporting Services (one of the BI modules of SQL Server 2005) for Teamcenter reporting.



Agenda



- ▶ Requirement and Business Value
- ▶ Teamcenter Reporting – Core Features
- ▶ Teamcenter Reporting - UI Flows
- ▶ Teamcenter Reporting and Analytics Module - Features
- ▶ Teamcenter Reporting Positioning
- ▶ Architecture & Components Overview
- ▶ Best Practices, Configuration and Operation Considerations
- ▶ Case Study – Reporting using a COTS SSRS Tool
- ▶ Conclusions



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*Transforming the
process of innovation*



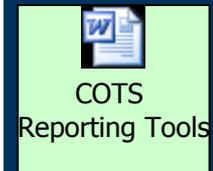
Requirements and Business Value



Requirements and Business Value



<p>User - “I need reports which may contain information not only from Teamcenter but from other systems we have”</p>	<p>Response – leveraging the Web-based XML-based framework will provide flexibility in selecting report data, presentation layout and output formats using browser clients</p>
<p>User - “I need the feature X”</p> <ul style="list-style-type: none"> ▶ Visually appealing graphical reports ▶ Multiple output formats ▶ Alerts, alarms, conditional highlighting ▶ Dashboards, charts ▶ Multiple delivery options (email, fileshare, community, printer) 	<p>Response – There are many features offered by COTS Business Intelligence tools. Bringing in a 3rd party BI Tool and integrating it with Teamcenter seamlessly is our strategic direction. Teamcenter leverages these capabilities to offer superior functionality that extend the Teamcenter OOTB capabilities.</p>
<p>User - “How are you ensuring that you are not locked down in one just COTS reporting tool?”</p>	<p>Response – Teamcenter Reporting Framework is flexible to plug-in a reporting tool of choice. It will support a few industry leading BI Tools OOTB</p>
<p>User - “We already have a reporting tool deployed. How does Teamcenter work with it?”</p>	<p>Response – Teamcenter will support industry leading Business Intelligence tools. Any tool that can tap use web services as a data source can work with Teamcenter.</p>
<p>User - “I need a wizard driven report definition without any code”</p>	<p>Response – Majority of the Reports can be defined and generated using the Teamcenter clients. For advanced reporting, Reporting & Analytics Module and BI Tools will come into picture</p>





Teamcenter Reporting - Core Features



Teamcenter Reporting Features



- ▶ Teamcenter Reporting OOTB
 - ▶ Query Builder
 - ▶ PLMXML Module
 - ▶ Report Definition
 - ▶ Report Deployment
- ▶ Teamcenter Reporting with COTS
 - ▶ Some of the capabilities offered by BI Tools are shown in subsequent slides



Teamcenter Reporting - Features



- ▶ Teamcenter Reporting uses Query capabilities for reporting purposes
- ▶ Query Builder – for building the queries
 - ▶ Simple Queries
 - ▶ Cross-Object Searches
 - ▶ Ability to navigate the entire data model
 - ▶ Support for conditions, filters
 - ▶ Ability to build custom queries
- ▶ Query Web Services
 - ▶ OOTB Queries are exposed to external applications through web services
 - ▶ Query web service
 - ▶ What are the OOTB Queries?
 - ▶ Given a Query, give me a description of the Query
 - ▶ Given a Query, execute it and fetch the results



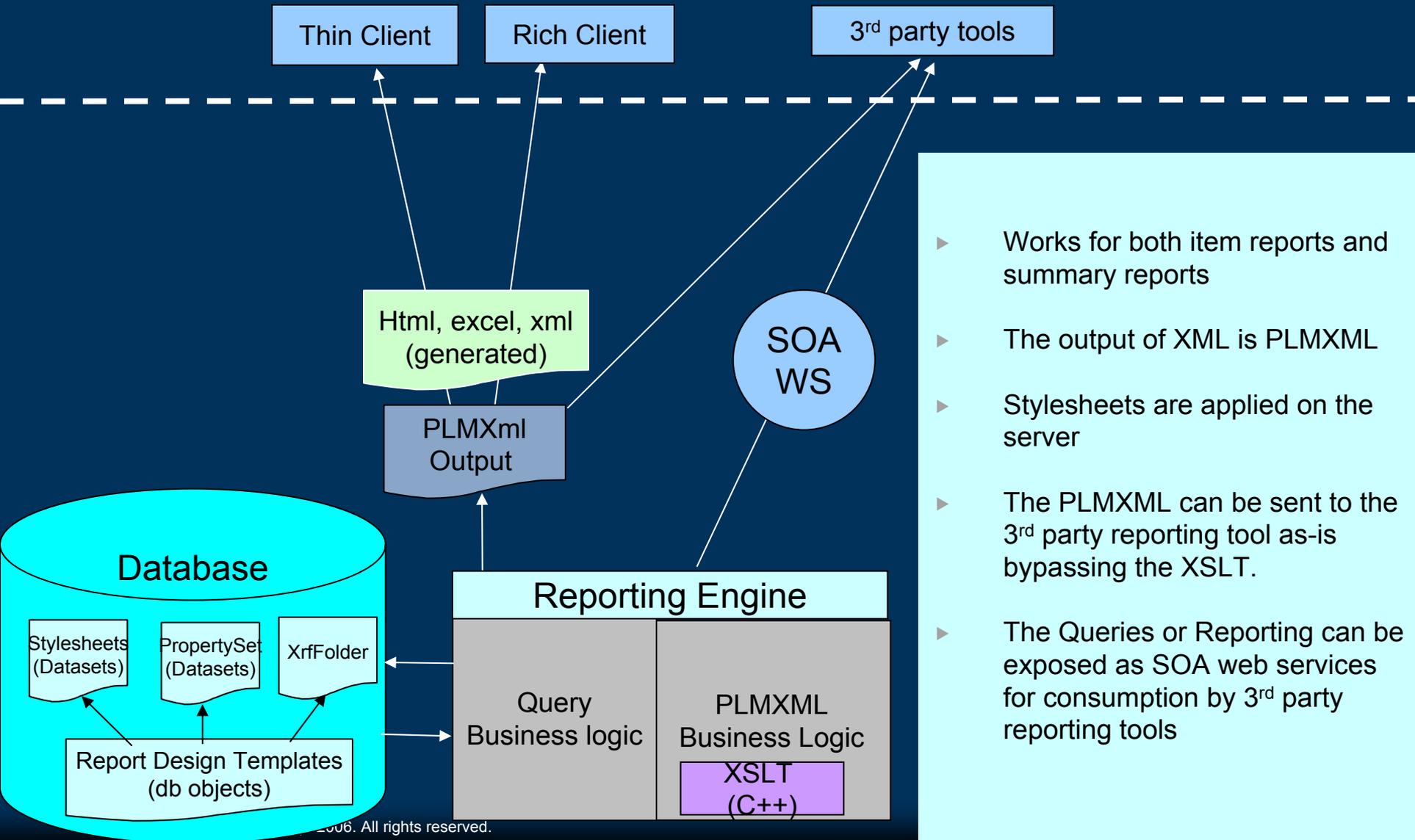
Teamcenter Reporting – Features (Contd.)



- ▶ Reporting Framework –
 - ▶ supports the item reports,
 - ▶ Support the Summary or saved search reports,
 - ▶ Enables wrapping the queries as reports
 - ▶ Outputs the extracted data as PLMXML
 - ▶ Produces the reports in excel, html and xml outputs using the stylesheets
 - ▶ Supports the downloading of the reports to the clients
 - ▶ Support saving the reports as datasets in Teamcenter
 - ▶ Exposes the reporting functionality as webservices (execution)
 - ▶ supports the deployment and uploading of OOTB reports
 - ▶ Supports the portability of report definitions
 - ▶ Supports integration with 3rd party COTS BI and Reporting tools



Teamcenter - Reporting Framework



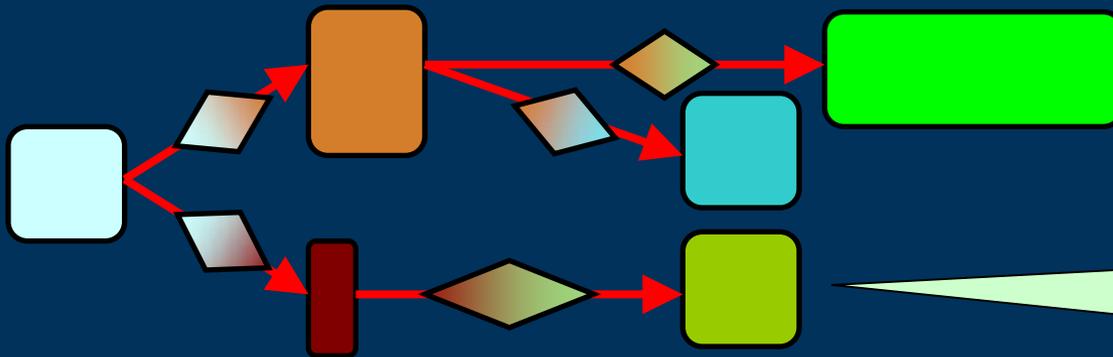
- ▶ Works for both item reports and summary reports
- ▶ The output of XML is PLMXML
- ▶ Stylesheets are applied on the server
- ▶ The PLMXML can be sent to the 3rd party reporting tool as-is bypassing the XSLT.
- ▶ The Queries or Reporting can be exposed as SOA web services for consumption by 3rd party reporting tools



Teamcenter Domain – Items, Relations, Navigations



Simple Query



Complex Query
(that navigates relations)
Each Object can have its own set of properties



Teamcenter Reporting – OOTB Reports



- ▶ 1. Admin – Objects By Status
- ▶ 2. Admin – Items By Status
- ▶ 3. WF – Items In Process
- ▶ 4. WF – Objects In Process
- ▶ 5. Admin – Object Ownership
- ▶ 6. Admin – item Ownership
- ▶ 7. Admin – Employee Information
- ▶ 8. Admin – Group/Role Membership
- ▶ 9. CM – Change Progress
- ▶ 10. CM – Change Forms
- ▶ 11. PS – BOM Structure



Teamcenter Reporting – OOTB Reports (Contd.)



▶ Teamcenter Manufacturing Reports

- ▶ 1. Plant-Structures - This report is used by Manufacturing objects of type Plant
- ▶ 2. Process-Structures - This report is used by Manufacturing objects of type Process
- ▶ 3. Product-Structures - This report is used by Manufacturing objects of type Product
- ▶ 4. Station Weld Data Report –
- ▶ 5. Station Visual Report -
- ▶ 6. Station Weld Data Report –
- ▶ 7. Station Station Data Report –
- ▶ 8. Zone Weld Report –
- ▶ 9. Weld Pattern Report –
- ▶ 10. Weld Report –
- ▶ 11. Weld Detail View and Datum Detail View - These are reports that contain data about a specific weld or a specific datum referenced by Spot/Datum fields in other reports



Teamcenter Reporting – OOTB Reports (Contd.)



▶ FGP Reports

- ▶ 12. ECO List Report with Solution Items - This report has data about General Information for a part, General Release Information and also Drawing Progress information.
- ▶ 13. ECO List Report without Cost - This report has data about work order details at a particular site.
- ▶ 14. ECO List Report with Cost - This report has data about work order details at a particular site along with the cost information
- ▶ 15. ECO List Report with Solution Items and Cost - This report has data about cost attributes along with the base information for a work order.
- ▶ 16. ECO Detail Report - This report has details about manufacturing engineering change order
- ▶ 17. Signoff Details Report - This report has details about signoff process.
- ▶ 18. Parts List Report - This report has details about BOM structure for a part/assembly.
- ▶ 19. Part Tracking Report - This report has details about tracking details of the engineering parts.
- ▶ 20. ME Tracking Report - This report has details about tracking details of the manufacturing engineering parts.



Teamcenter Reporting - UI Flows



Basic Reporting in Teamcenter – Process



- ▶ A. Determine the reporting / data needs
- ▶ B. Define a Report using Portal Client
 - ▶ B.1 Use Query Builder for the summary reporting
 - ▶ B.2. Use the item report if the user selects an item for reporting
 - ▶ B.3. Define the navigations, properties, filters, conditions
 - ▶ B.4. Define any custom stylesheets required for rendering the data
 - ▶ B.5. Save the report for later deployment
- ▶ C. Generate a report using Portal or Thin Clients
 - ▶ C.1 Chose a report; Supply the parameters
 - ▶ C2. Chose the output format
 - ▶ C3. Generate a report, download it or save it to Teamcenter



Advanced Reporting in Teamcenter – Process



- ▶ A. Using Teamcenter Reporting and Analytics module, define a report.
- ▶ B. Define the metadata (schedules, delivery options, execution options) on the report definition.
- ▶ C. Save the report definition (in the tool or in the Teamcenter)
- ▶ D. Generate the report
 - ▶ From Teamcenter Portal Client
 - ▶ Or from Teamcenter thin client
 - ▶ Or from the default client provided by Reporting / BI Tool

The process of using a 3rd party COTS tool for defining the reports
Will be illustrated through the SSRS Case Study later in the presentation



Teamcenter – Creating a Report Definition



The screenshot displays the 'Report Designer - Teamcenter Engineering 2005' application window. The interface includes a menu bar (File, Edit, Desktop, Help), a navigation pane on the left with 'Report Designer' selected, and a main workspace. The workspace shows the configuration for a report named 'mvn_item_report'. The 'Design Name' field is set to 'mvn_item_report', and the 'Design Description' field is empty. The 'Saved Query' is set to 'mvn_items', and the 'Property Finder Formatter' is set to 'mvn_item_ppf'. Below these fields are two panes: 'Report Formatters' and 'Selected Formatters'. The 'Report Formatters' pane lists various style sheets, with 'default_excel_template.xlt' selected. The 'Selected Formatters' pane is currently empty. At the bottom of the workspace are buttons for 'Create', 'Modify', 'Delete', and 'Clear'. The status bar at the bottom left shows 'Ready' and the bottom right shows '0'.

Define Report Name

Specify a description for the report

Associate a saved query for the report

Associate a Property Finder Formatter for the report

Report specific style sheets

All OOTB style sheets

All OOTB report designs



Report Design Authoring



Associate a saved query

Name: My Fancy Query

Description: Finds Items that have specified values in the Item Master Form.

Import Export

Search Class: Item Show Hints

Local Query Remote Query

Attribute Selection

- Archive Comments
- Group ID [Group]
- Last Modifying User [User]
- Owner [User]
- Date Created
- Date Archived
- Date Modified
- Date Last Backup
- Name
- Description
- Type

Search Criteria

	Attribute	User Entry Name		Default Value
	item_id	ID	=	
AND	object_name	Name	=	

Create Clear



Report Definition - Authoring



Associate a Property Finder Formatter

Property Path	Column Names
Item.item_id	ID
Item.object_name	Name
Form.user_data_1	user_data_1
Form.project_id	project_id
Form.item_comment	item_comment



Report Definition – Authoring (Contd.)



Associate one or more report formats (Style sheets)



Report Generation in Portal UI



▶ Report Instance

- ▶ Display in Excel if format chosen was Excel template
- ▶ Display in Browser
- ▶ Display in Print Dialog as HTML file if format chosen was XSL and can
 - ▶ save the output to file as XML/HTML/delimited text file
 - ▶ print the output
 - ▶ display result in a browser
 - ▶ launch Excel

Report Creation Wizard

Report Dialog

Steps

- ▶ Select
- ▶ Fill in
- ▶ Select

HTML HTML / Text

Wed Apr 19 09:43:42 CDT 2006

56 objects

Default xml Report - Microsoft Internet Explorer

Address: C:\Temp\report28502.htm

Admin - Items By Status

[Search Criteria Used](#)

Item Id	Item Revision Id	Object Name	Object Type	Release Status	Date Released	User Name	Group Name	Current ID
cap_screw_cb_inch	A	cap_screw_cb_inch	ItemRevision			infodba	dba	cap_screw_cb_inch
000023	A	rev_as_numbers	ItemRevision			infodba	dba	000023
000023	B	rev_as_numbers	ItemRevision			infodba	dba	000023

Microsoft Excel - default_excel_template1

Item Id	Item Revision	Object Name	Object Type	Release Status	Date Released	User Name
cap_screw_cb_inch	A	cap_screw_cb_inch	ItemRevision			infodba
	23	rev_as_numbers	ItemRevision			infodba
	23	rev_as_numbers	ItemRevision			infodba
standard_thread_inch	A	standard_thread_inch	ItemRevision			infodba
fit_hole_inch	A	fit_hole_inch	ItemRevision			infodba
cap_screw_cs_inch	A	cap_screw_cs_inch	ItemRevision			infodba
	5	assembly	ItemRevision			infodba
	6	assembly	ItemRevision			infodba
	3	Item1	ItemRevision			infodba
	19	\$PR_item	ItemRevision			infodba
standard_thread_metric	A	standard_thread_metric	ItemRevision			infodba
	0	rev_as_numbers	ItemRevision			infodba
	1	rev_as_numbers	ItemRevision			infodba
fit_hole_metric	A	fit_hole_metric	ItemRevision			infodba
	2	rev_as_numbers	ItemRevision			infodba
	3	rev_as_numbers	ItemRevision			infodba
	4	rev_as_numbers	ItemRevision			infodba
	5	rev_as_numbers	ItemRevision			infodba
cap_screw_cs_metric	A	cap_screw_cs_metric	ItemRevision			infodba



Report Generation Web UI



Teamcenter Web - navigator - Home - [] - Microsoft Internet Explorer

Address http://localhost:7001/tc/webclient

Home Logout

infodba - dba / DBA - Latest Released - []

Generate Report

Report Design * Admin - Items By Status

Query * no criteria

Formatter [v]

Save to Dataset

Dataset Name []

OK Apply Cancel

Item ID	Name	Type	Relation	Owner	Group ID	Date Modified
	Alias Seed Parts	Folder				
	Audit Report Formats	Folder				
	CAM Setup Templates	Folder				
	COM00001	EngChange		infodba	dba	03-Oct-2005
	COM00002	EngChange		infodba	dba	01-Oct-2005
	COM00003	EngChange		infodba	dba	07-Mar-2006
	COM00010-AAA	EngChange		infodba	dba	10-Oct-2005
	COM00011-2222222	EngChange		infodba	dba	11-Oct-2005
	COM00012	EngChange		infodba	dba	11-Oct-2005
	COM00013	EngChange		infodba	dba	11-Oct-2005
	COM00014	EngChange		infodba	dba	13-Oct-2005

Admin - Items By Status

Name [*]

Item ID [*]

Revision [001]

Type [CORP_Part Revision]

Released After [01-Jan-2006]

Released Before [01-Apr-2006]

Owning User [infodba (infodba)]

Owning Group [dba]

Release Status [*]

OK Clear Cancel

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Admin - Items By Status

Apr 19, 2006 Wednesday

[Search Criteria Used](#)

Item ID	Item Revision	Object Name	Object Type	Release Status	Date Released	User Name	Group Name
GMO00116	001	ASSY 001	CORP_Part Revision	Released	31-Jan-2006 17:27	infodba	dba

Search Criteria Used: (1 Objects found)

- Name = *
- Item ID = *
- Revision = 001
- Type = CORP_Part Revision
- Released After = 01-Jan-2006
- Released Before = 01-Apr-2006
- Owning User = infodba
- Owning Group = dba
- Release Status = *

[Go to top of page](#)



Report Generation Web UI



The screenshot displays the Teamcenter Web UI interface. A 'Generate Report' dialog box is open, showing the following configuration:

- Report Design: Admin - Items By Status
- Query: Name=*, Item ID=*, Revision=001, T Released After=01-Jan-2005, Release Owing User=x_valive, Owing Group
- Formatter: default_excel_template.xlt
- First Cell: A4
- Buttons: OK, Apply, Cancel

Below the dialog, a table of generated report data is visible. The table has columns for Object Name, Object Type, Release Status, Date Released, User Name, and Group Name. The data is as follows:

Object Name	Object Type	Release Status	Date Released	User Name	Group Name
ug-50360	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-st2010-06	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-50303-01	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-ms9549-17	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-50360	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-st1512-55	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-ms21902-6r	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-st1382-07	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-50081	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-50211	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-512640	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-ms9697-12	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-50349	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-50420	ItemRevision	Released	12/17/01 15:22	ishutin	product development
ug-52005	ItemRevision	Released	12/17/01 15:21	ishutin	product development
ug-52004	ItemRevision	Released	12/17/01 15:21	ishutin	product development
ug-52003	ItemRevision	Released	12/17/01 15:21	ishutin	product development
O-Ring	ItemRevision	Pre-Released	6/12/02 16:22	x_narayana	dba
Mod. Inner Lip Seal	ItemRevision	Pre-Released	6/12/02 16:56	x_narayana	dba
Mod. Inner Lip Seal	ItemRevision	Pre-Released	6/12/02 16:56	x_narayana	dba
Mod. Inner Lip Seal	ItemRevision	Released	6/12/02 16:56	x_narayana	dba
robot9_chc-2.5x7	ItemRevision	Released	1/23/03 14:14	xuesimon	dba
appr_1_chc-2.5x7	ItemRevision	Released	10/26/01 16:56	infodba	dba
Modified Handle	ItemRevision	Released	6/28/02 18:19	x_narayana	dba
Modified Handle	ItemRevision	Pre-Released	6/28/02 18:19	x_narayana	dba
Bonnet Assy	ItemRevision	Released	6/12/02 16:27	x_narayana	dba
brake-lever-mm	ItemRevision	Released	1/23/03 13:00	ishutin	dba



Teamcenter Reporting and Analytics Module - Features



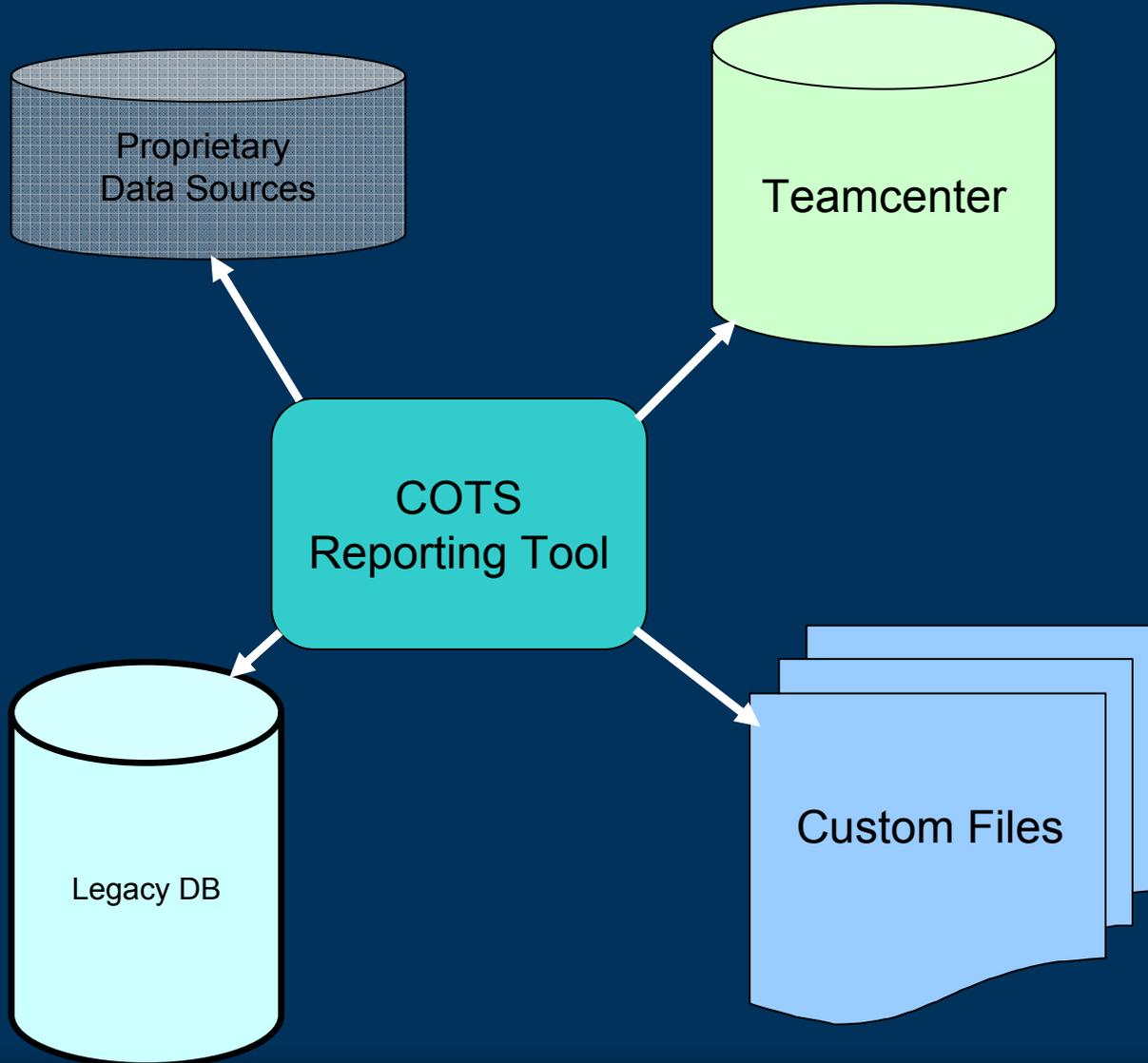
Teamcenter Core Reporting vs Teamcenter Reporting & Analytics Module



Teamcenter Core Reporting	Teamcenter Reporting & Analytics Module
<p>Summary reports based on Queries</p> <p>Item reports based on navigations</p> <p>Data Extraction through object, relationship navigatioss</p> <p>Default and custom Stylesheets</p> <p>Html, Excel, xml outputs</p>	<p>Reporting from Multiple data sources (data can come not only from Teamcenter but from other sources as well)</p> <p>Graphical reporting (pie, bar, line charts; graphs)</p> <p>Scheduling, monitoring of the schedules</p> <p>Multiple output formats (pdf, html, xml, excel)</p> <p>Multiple delivery options (email, fileshare, TcCommunity, printer)</p> <p>Caching, snapshots, Conditional formatting</p>



COTS tools can pull data from Multiple Data Sources

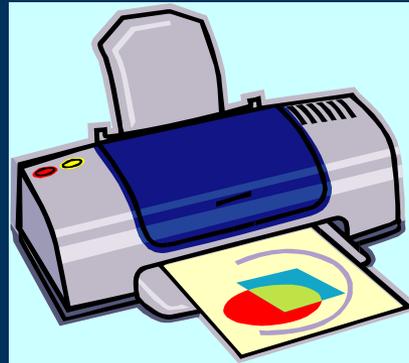
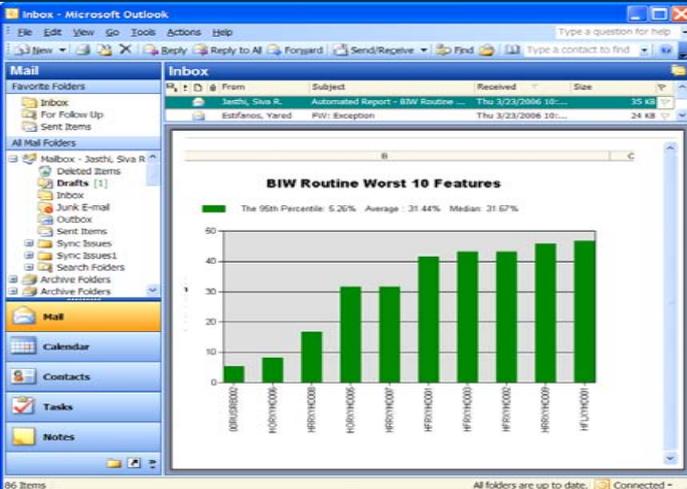


Use Cases:

1. Teamcenter connects to only Teamcenter database for reporting purpose. However, customers need to pull the data from multiple sources for generating a single report.
2. Multiple data sources can be different databases, different systems, local files, multiple formats

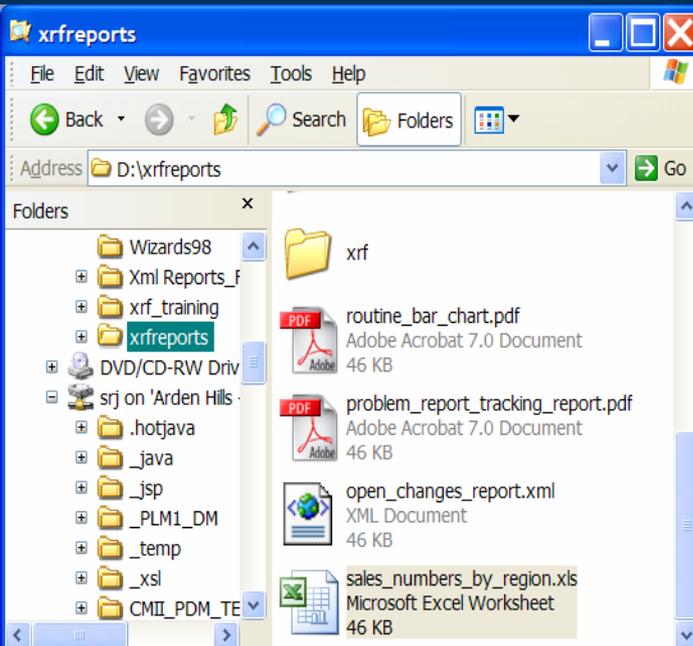


Delivery Options



Bug Tracking

Week	CHG P1	CHG P2	CHG P3	RPT P1	RPT P2	RPT P3	Total
11_21_2005	2	6	7	5	19	7	46
11_28_2005	2	6	7	6	19	7	47
12_05_2005	1	5	6	7	21	9	49
12_12_2005	0	3	4	7	21	9	44
12_19_2005	1	3	4	7	25	12	52
12_26_2005	1	3	4	7	23	11	49
01_02_2006	1	3	4	6	23	10	49
01_09_2006	1	3	4	6	23	9	46
01_16_2006	1	3	5	6	23	9	47
01_23_2006	2	4	5	7	24	9	50
01_30_2006	2	4	4	8	23	7	48
02_06_2006	2	8	4	10	14	7	45
02_13_2006	3	5	4	9	15	6	42
02_20_2006	3	7	4	10	18	7	49
02_27_2006	2	6	4	12	19	7	50
03_06_2006	2	6	4	10	23	6	51
03_13_2006	3	6	3	9	21	5	47
03_20_2006	0	2	2	7	19	5	38



COTS Reporting

```
ReportArchiver.java  
/**  
 * Class for archiving the generated reports as datasets  
 **/  
public class ReportArchiver  
{  
    String instanceName;  
  
    /**  
     * constructor for the ReportArchiver  
     **/  
    ReportArchiver(String instance_name)  
    {  
        instanceName = instance_name;  
    }  
  
    /**  
     * main method for archiving the report file  
     **/  
}
```



Scheduled Delivery to Email



A report can be delivered to one or more emails on a schedule

The screenshot shows the Microsoft Outlook interface. The main window displays an email from 'Estifanos, Yared' with the subject 'FW: Exception'. The email content features a bar chart titled 'BIW Routine Worst 10 Features'. The chart shows the percentage of users for various features, with the 95th Percentile at 5.26%, Average at 31.44%, and Median at 31.67%.

Feature ID	Percentage
00RUSR002	~5%
H0RXYH006	~8%
HRRXYH008	~17%
H0RXYH005	~32%
HRRXYH007	~32%
HFRXYH001	~42%
HFRXYH003	~43%
HFRXYH002	~43%
HRRXYH009	~45%
HFLXYH001	~47%

Use Cases:

1. (User A) Generate a report and deliver the report in my preferred format (pdf) to my email on a predefined schedule
2. (User A) Generate a report and deliver the report to User B as per User B's preferences
3. (Admin) Generate the report and deliver the report to User A, User B, User C through email
4. (Admin) Generate the report and deliver the report to all users in the Group DEV.
5. (Admin) Generate the report, query the database or API for getting all the users in Group DEV, and deliver the report to their email addresses.



Scheduled Delivery to Teamcenter Community



Bug Tracking - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

https://mycommunity.ugs.com/products/tc/tc/bash_staff/denley/£

Getting Started Latest Headlines

Home Documents and Lists Create Site Settings Logout Help Up to Sheets staff

Change Management, Search and Reports

Bug Tracking

Advanced Search...

Select a View

All Items

Last Four

Actions

- Alert me
- Export to spreadsheet
- Modify settings and columns

Bug Tracking

New Item Filter Edit in Datasheet

Week	CHG P1	CHG P2	CHG P3	RPT P1	RPT P2	RPT P3	Total
11_21_2005	2	6	7	5	19	7	46
11_28_2005	2	6	7	6	19	7	47
12_05_2005	1	5	6	7	21	9	49
12_12_2005	0	3	4	7	21	9	44
12_19_2005	1	3	4	7	25	12	52
12_26_2005	1	3	4	7	23	11	49
01_02_2006	1	3	4	8	23	10	49
01_09_2006	1	3	4	6	23	9	46
01_16_2006	1	3	5	6	23	9	47
01_23_2006	2	4	5	7	24	9	51
01_30_2006	2	4	5	8	23	9	50
02_06_2006	2	5	4	11	16	7	44
02_13_2006	3	5	4	9	16	6	42
02_20_2006	3	7	4	10	18	7	50
02_27_2006	2	6	4	12	19	7	50
03_06_2006	2	6	4	10	23	6	51
03_13_2006	3	6	3	9	21	5	47
03_20_2006	0	2	2	7	19	5	35

Done mycommunity.ugs.com

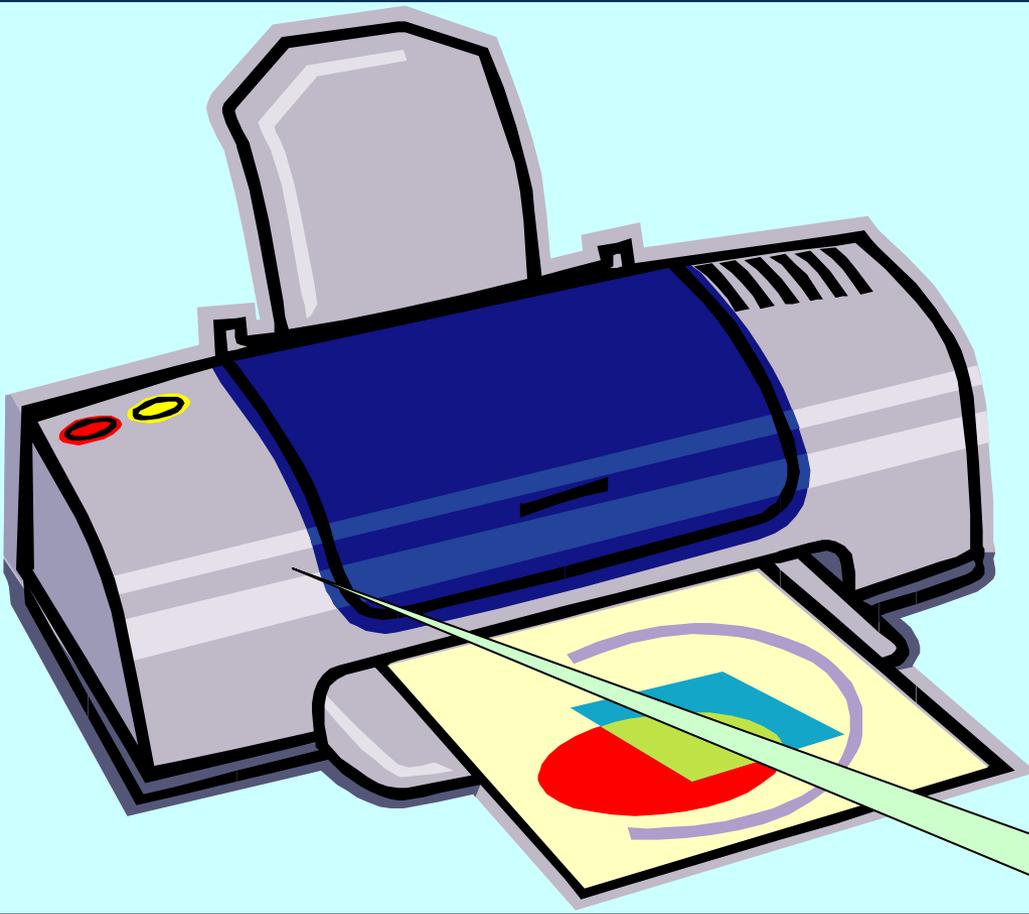
Use Cases:

1. Generate a report and deliver the report to Teamcenter Community on a predetermined schedule
2. Show all the available reports for a domain or solution in TcCommunity portal
3. Let users select and demand (execute) a report from TcCommunity
4. Show the generated report (pdf or excel or chart) in TcCommunity.

A report can be delivered to Teamcenter Community document libraries



Scheduled Delivery to a Printer



Use Cases:

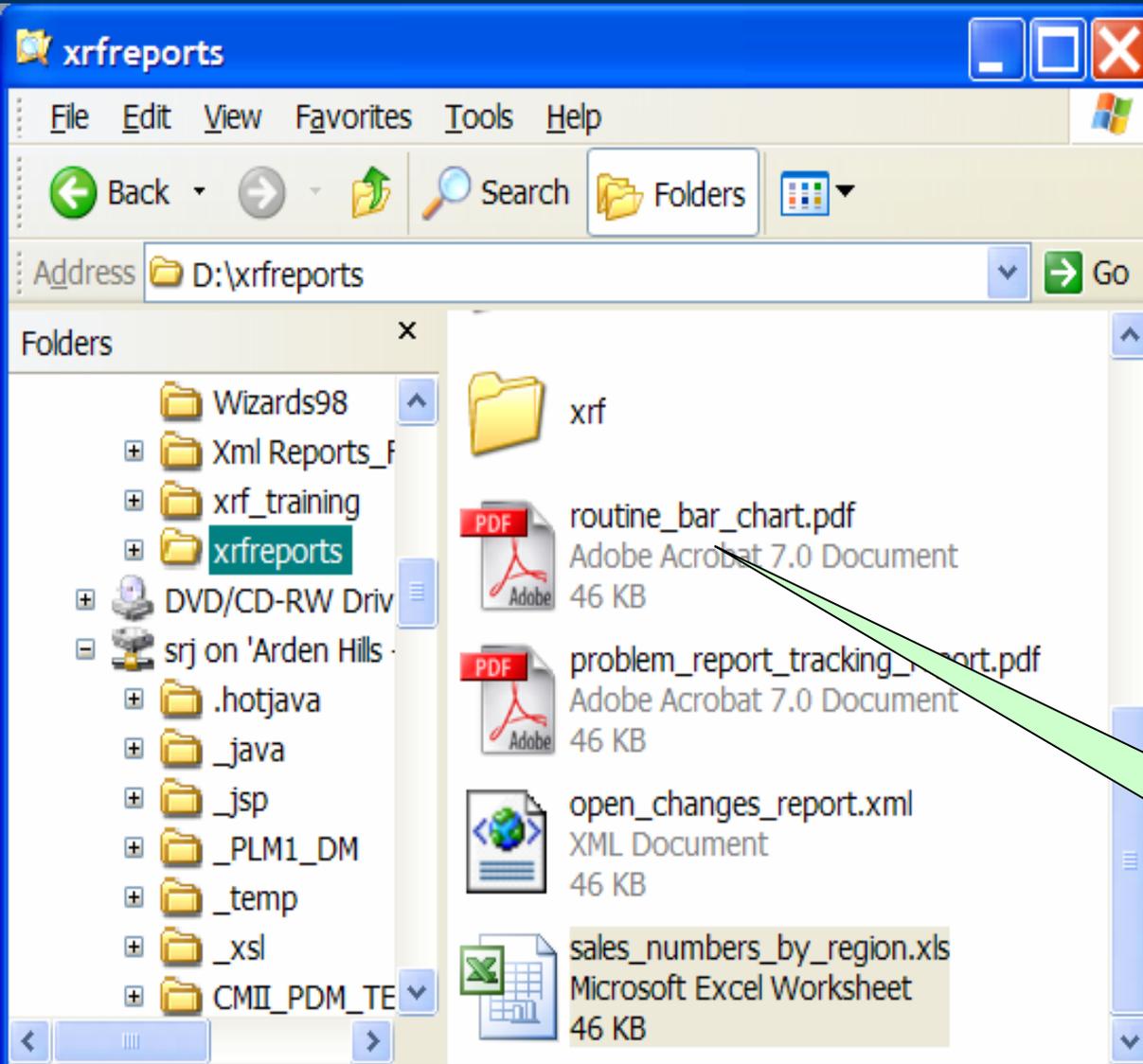
1. Generate a report and deliver the report to network Printer X on a predetermined schedule

(eg: I would like to pick up the “outstanding PRs” report every Monday morning at 9 AM CST from the printer mspmxerox2)

A report can be delivered on schedule to any printer connected to the network



Scheduled Delivery to a File System



Use Cases:

1. Generate a report and deliver the report to a file system to support the users and programs that can access the shared file system

A report can be delivered on schedule to any directory on the file system.



Scheduled Delivery to a Web Service or a Custom Application



```
TextPad - [C:\Documents and Settings\srf\Desktop]ReportArchiver.java
File Edit Search View Tools Macros Configure Window Help
ReportArchiver.java
/**
 * Class for archiving the generated reports as datasets
 */
public class ReportArchiver
{
    String instanceName;

    /**
     * constructor for the ReportArchiver
     */
    ReportArchiver(String instance_name)
    {
        instanceName = instance_name;
    }

    /**
     * main method for archiving the report file
     */
}
```

Use Cases:

1. Generate a report and deliver the report to a web service which may archive the report to a database
2. Generate a report and deliver the report to a web service which may attach the report to another item (such as part or change request)

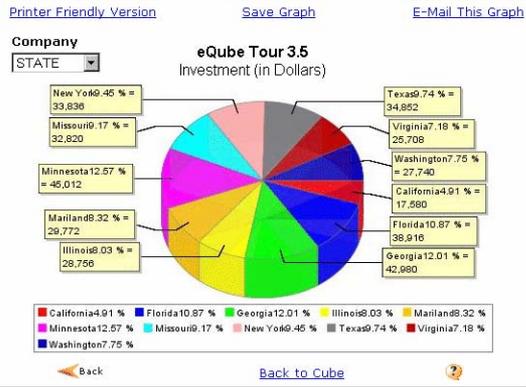
A report can be delivered on schedule to a WebService or a custom application.



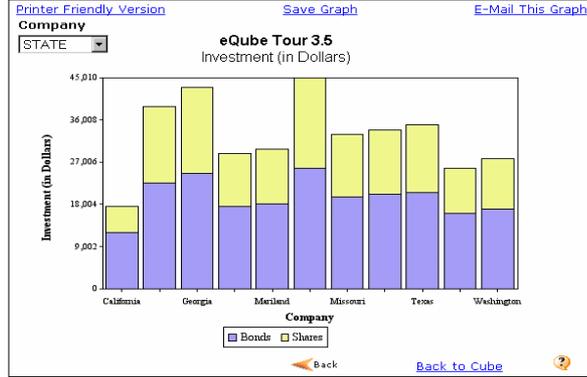
Sample Graphical Reports – from eQube



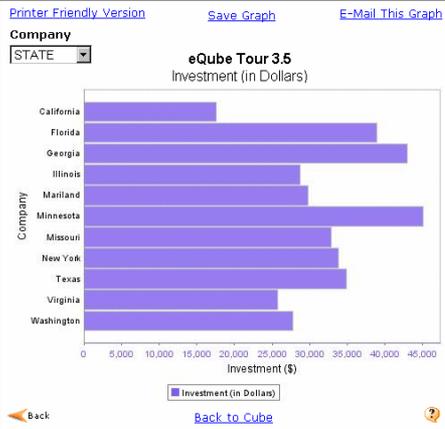
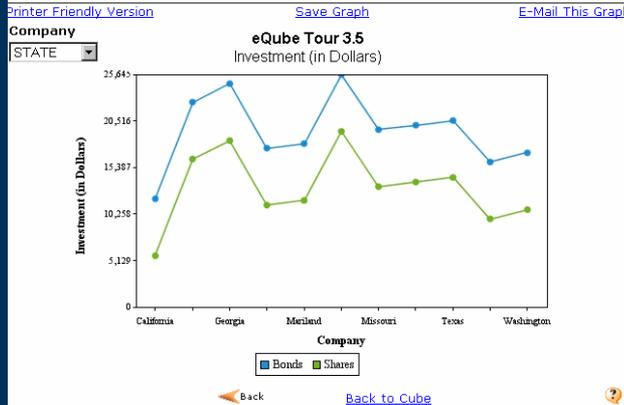
Sample 3D Pie Chart



Sample Stacked Bar Chart



Sample Line Series Chart





Sample Gauges – from Dundas



Marketing Dashboard - Summary - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://demos1.dundas.com/DundasGauge/MarketingDashboard/Summa

Corporate Intronet

Summary Marketing Costs Web Banners Website

Use the drop list controls on the right to select the time period as well as the product. Period: [All of 2004] Product: [All Products]

Website Visits to Closes

- Website Visits: 5,287,260
- Eval Downloads: 144,051
- Valid Contacts: 87,097
- Qualified Leads: 18,465
- Quotes: 14,917
- Closes: 13,277

Revenue vs Marketing Cost

Month	Revenue (in Thousands)	Marketing Cost (in Thousands)
Jan 04	~200	~150
Feb 04	~250	~180
Mar 04	~350	~250
Apr 04	~450	~300
May 04	~550	~350
Jun 04	~650	~400
Jul 04	~750	~450
Aug 04	~850	~500
Sep 04	~950	~550
Oct 04	~1100	~600

Key Performance Indicators (KPI)

- Cost per Sale:** Gauge showing a value of approximately 250 USD.
- Sales per Download:** Gauge showing a value of approximately 8.
- Revenue per Sale:** Gauge showing a value of approximately 400 USD.
- Profit per Sale:** Gauge showing a value of approximately 250 USD.

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 416-467-5100 / 800-463-1492 sales@dundas.com

powered by **Dundas Chart for .NET** & **Dundas Gauge for .NET**

Dundas Gauge for .NET Demos Real Time Binary Streaming Demo

Web Server: 55.5
 SQL Server: 87.6
 Firewall: 48.2
 Total Server Load: 5.0
 Throughput: 1.0

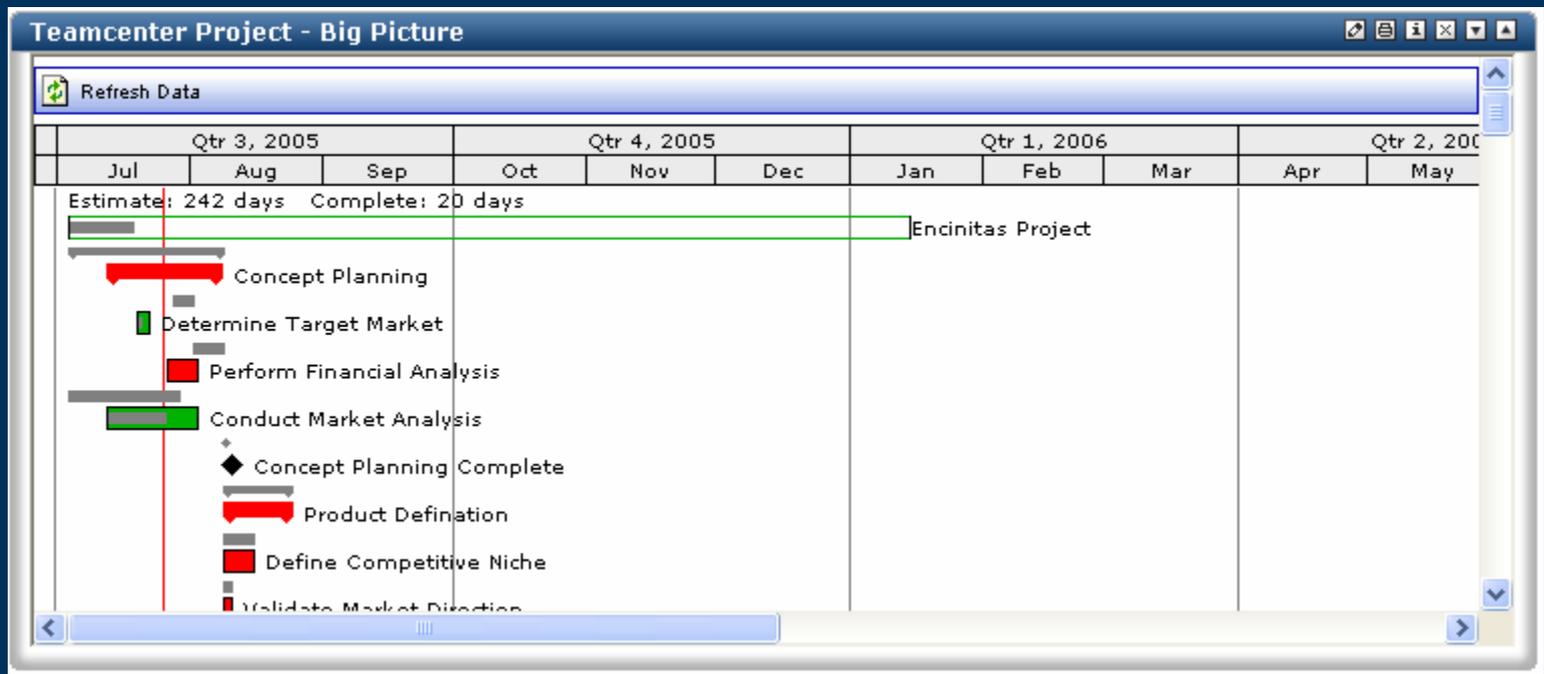
Dundas Gauge for .NET Demos Smart Client Dampening Demo



Example Gantt Chart / Dashboard

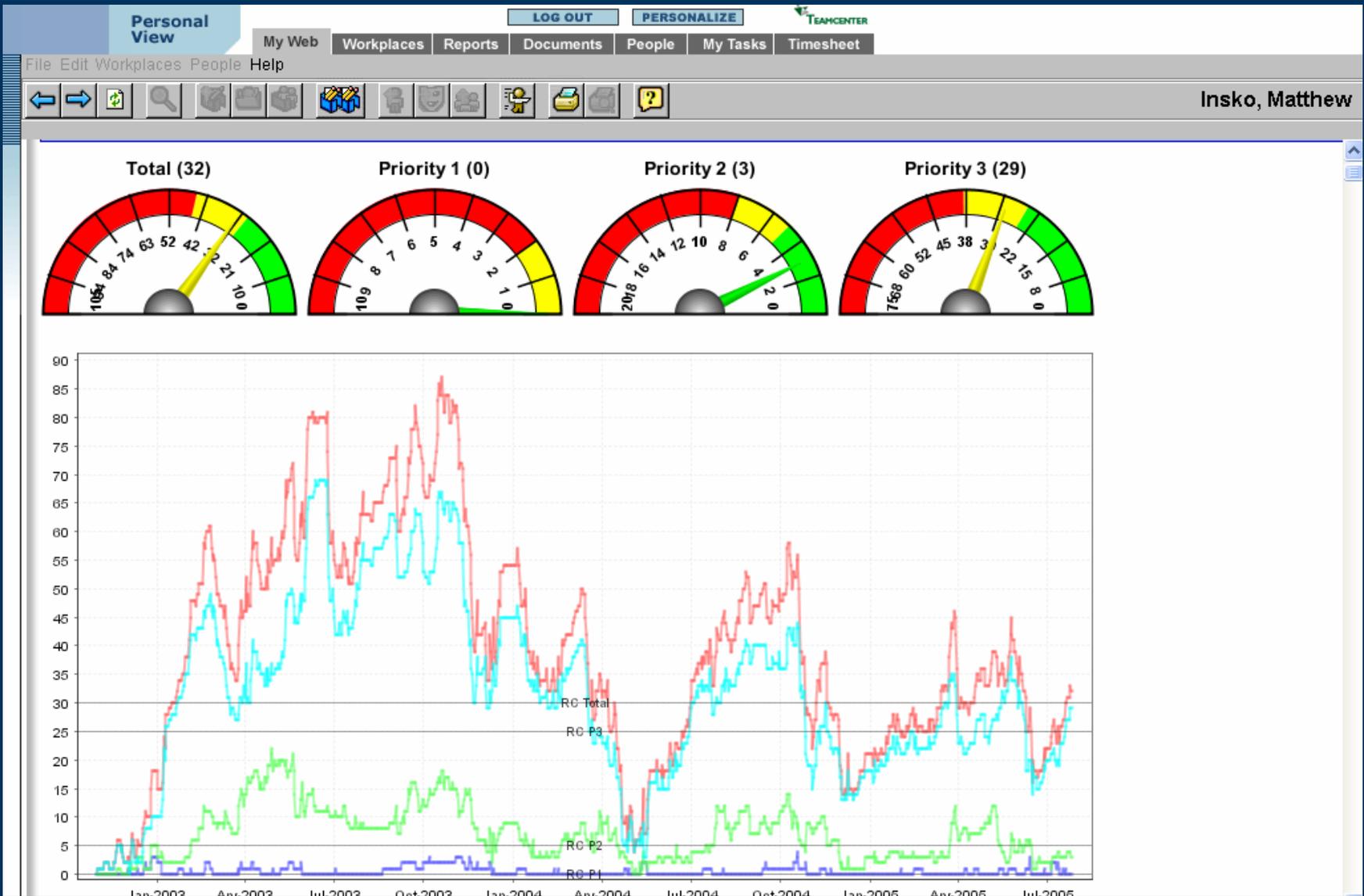


- ▶ Cross Workplace Overview including Tasks, Milestones, Baselines, & Task Status
- ▶ Clicking on a task will open the thick client schedule





Dashboards – some examples





COTS BI Tools – Other Features



- ▶ Caching
- ▶ History
- ▶ Snapshots
- ▶ Monitoring
- ▶ Subscriptions
- ▶ Many more..





Teamcenter Reporting – Positioning



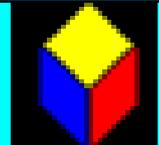
Teamcenter Reporting – Considerations



- ▶ There are many reporting tools in the market
 - ▶ Commercial Vendors
 - ▶ Database Vendors
 - ▶ Open Source Tools
- ▶ There are also some common themes across all these tools
 - ▶ [1] How do you get the data?
 - ▶ [2] Where do you perform the processing
 - ▶ [3] How and where do you render?
 - ▶ [4] How is the security addressed?
 - ▶ [5] What are the reporting tool features?
 - ▶ [6] What are the technologies used in the tool?
- ▶ See the “Reporting Features” excel spreadsheet on the features 3rd party reporting tools can provide and how these are relevant for Teamcenter



COTS
Reporting Tools



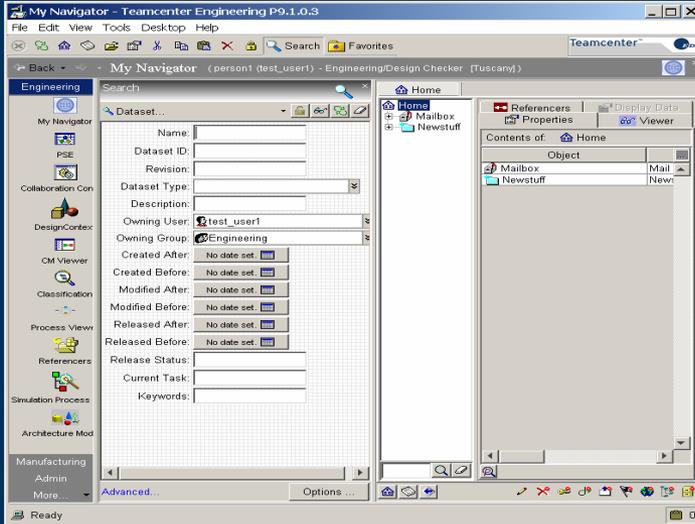
COTS BI -
Features



Search, Reporting and Dashboard Vision

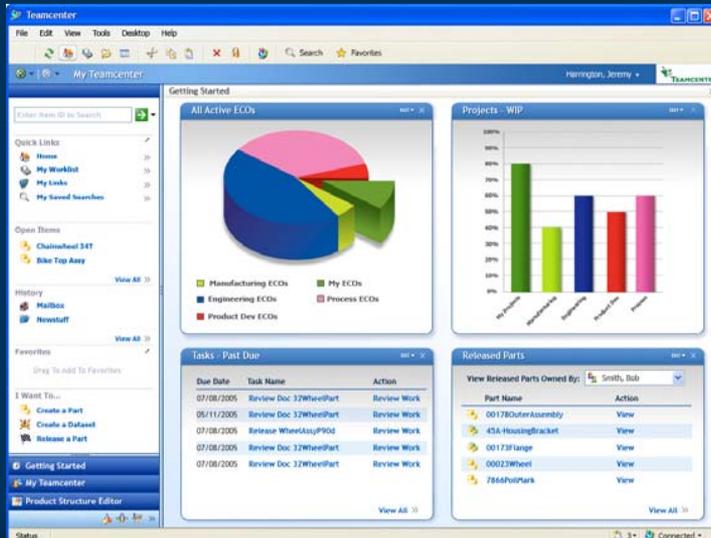
TEAMCENTER

Today



- ▶ Keyword based full text search for metadata and bulk data
- ▶ Configurable user reports specific to data in PLM
- ▶ Limited integration with 3rd party reporting systems
- ▶ No “Big Picture” representation of PLM data

Tomorrow



- ▶ Provide “Big Picture” with supporting details by presenting information in graphical dashboards with drill down capability
- ▶ Customers leverage vendor of choice for search and reporting
- ▶ Integrated Search, Reporting and Import/Export framework for Teamcenter



Teamcenter Reporting – Positioning (Different Customer Scenarios)



Type 3: I already have a reporting tool deployed in my organization. And that is one of the tools Teamcenter already supports.

Type 2: I need advanced capabilities (scheduling, graphical reports, Dashboards) and I expect Teamcenter to provide me a solution

Type 1: I just need some basic capabilities. Getting excel and html reports is good enough. I don't want to pay extra for something I don't want.



Teamcenter Reporting – Positioning (Different Solutions)



Type 3: I already have a reporting tool deployed in my organization. And that is one of the tools Teamcenter already supports.

Teamcenter
Reporting & Analytics
(Adaptor for Tool X)

Type 2: I need advanced capabilities (scheduling, graphical reports, Dashboards) and I expect Teamcenter to provide me a solution

Teamcenter
Reporting & Analytics

Type 1: I just need some basic capabilities. Getting excel and html reports is good enough. I don't want to pay extra for something I don't want.

Teamcenter
Core module



UGS

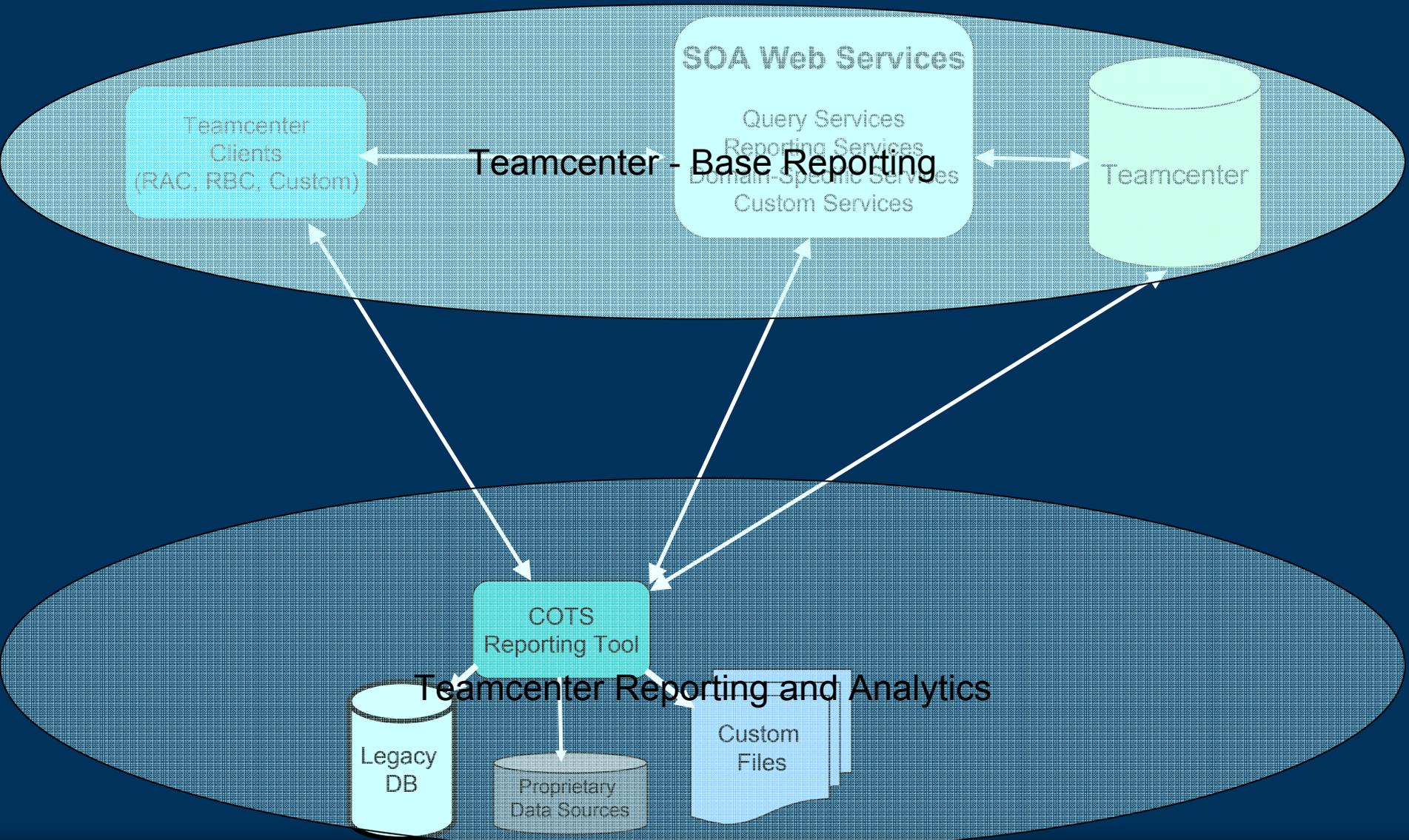
*Transforming the
process of innovation*



Architecture and Components Overview

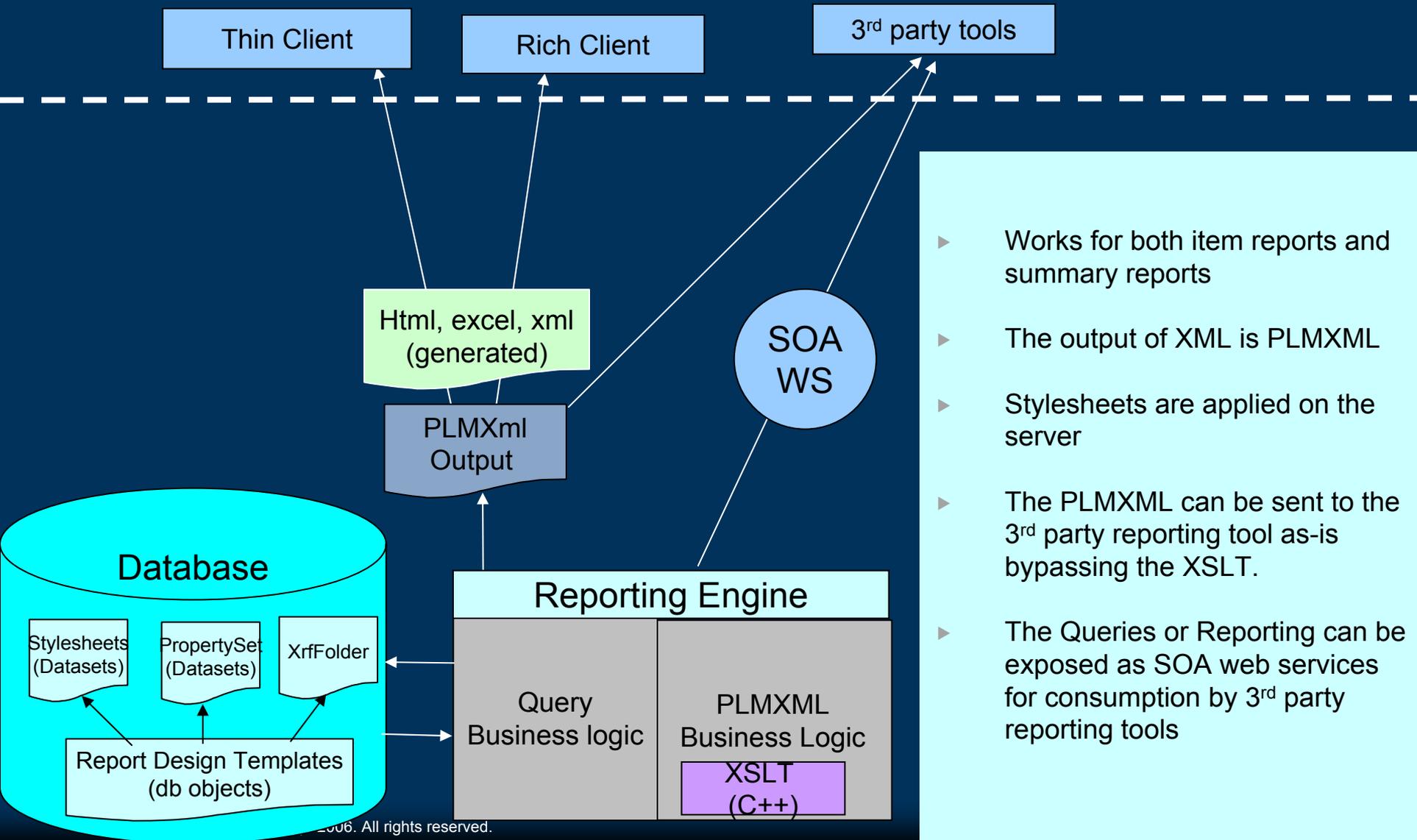


Teamcenter Reporting – Roadmap

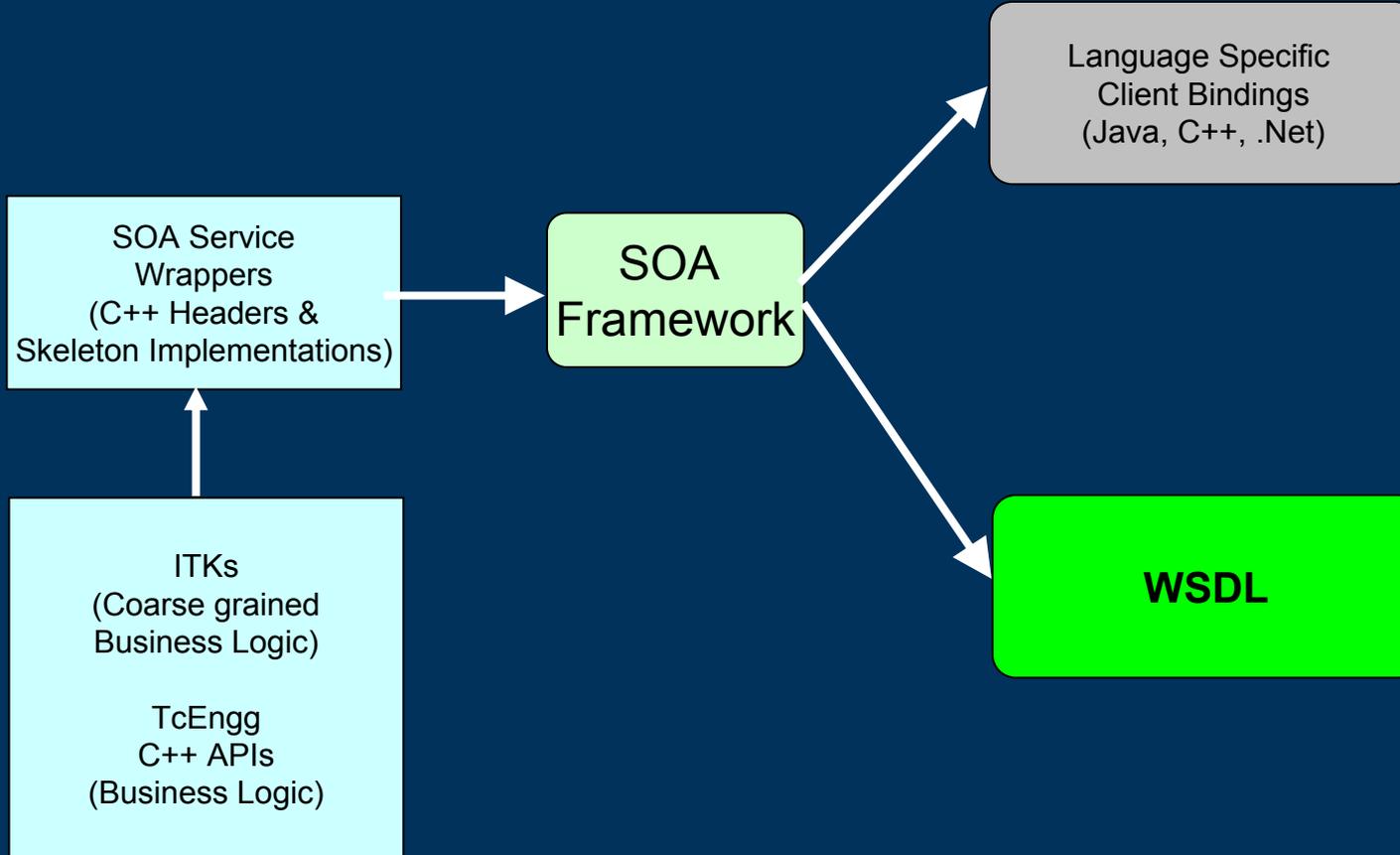




Teamcenter - Reporting Framework



- ▶ Works for both item reports and summary reports
- ▶ The output of XML is PLMXML
- ▶ Stylesheets are applied on the server
- ▶ The PLMXML can be sent to the 3rd party reporting tool as-is bypassing the XSLT.
- ▶ The Queries or Reporting can be exposed as SOA web services for consumption by 3rd party reporting tools



Core Web Services from SOA:

System (login, groups, roles), Data Management (create, delete, get properties, change owner),
Query (get the queries, describe a query, execute a query)
File Management, Reservation, IRM (access, privileges)



The WSDL for Teamcenter Web Services



```
<?xml version="1.0" encoding="UTF-8" ?>
- <wsdl:definitions targetNamespace="http://teamcenter.com/Services/Core/2006-03/SavedQuery"
  xmlns="http://schemas.xmlsoap.org/wsdl/" xmlns:imp0="http://teamcenter.com/Schemas/Soa/2006-03/Base"
  xmlns:imp1="http://teamcenter.com/Schemas/Soa/2006-03/Exceptions"
  xmlns:imp2="http://teamcenter.com/Schemas/Core/2006-03/SavedQuery"
  xmlns:imp3="http://teamcenter.com/webservices/2005-06/schemas/WSFaults"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:tns="http://teamcenter.com/Services/Core/2006-03/SavedQuery"
  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/" xmlns:ws-i="http://ws-i.org/schemas/conformanceClaim/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema">
- <wsdl:types>
  - <xs:schema>
    <xs:import namespace="http://teamcenter.com/Schemas/Soa/2006-03/Base"
      schemaLocation="../schemas/SoaBase.xsd" />
    <xs:import namespace="http://teamcenter.com/Schemas/Soa/2006-03/Exceptions"
      schemaLocation="../schemas/SoaExceptions.xsd" />
    <xs:import namespace="http://teamcenter.com/Schemas/Core/2006-03/SavedQuery"
      schemaLocation="../schemas/Core0603SavedQuery.xsd" />
    <xs:import namespace="http://teamcenter.com/webservices/2005-06/schemas/WSFaults"
      schemaLocation="../schemas/WSFaults.xsd" />
    </xs:schema>
  </wsdl:types>
- <wsdl:message name="InternalServerErrorExceptionFault">
  <wsdl:part element="imp1:InternalServerErrorException" name="exx01" />
  </wsdl:message>
```




Best Practices, Configuration and Operation Considerations



Configuration and Operation Considerations



- ▶ Teamcenter Reporting (both base reporting and advanced reporting) is supported under the same operating constraints
 - ▶ Platforms
 - ▶ Versions
 - ▶ application servers
 - ▶ Deployment and installation support
 - ▶ Architecture
- ▶ Around 30 common and basic reports are shipped OOTB; Customers can decide not to deploy some of these reports.
- ▶ The report definitions are portable as long as the underlying datamodel used by the report is same.
- ▶ So one can create a report definition and save the definition as XML. This XML definition can be ported to any other Teamcenter deployment.



Creating Summary Item reports



- ▶ Summary Reports are typically based on Queries
- ▶ The Queries can span multiple objects through relationship navigation
- ▶ Wrap the Query as a report
- ▶ Designate the report as Summary report
- ▶ Summary Reports are context-free
- ▶ OOTB Default Stylesheets are good enough for most reports. Attach custom stylesheets as required
- ▶ Generate the report



Creating Item reports



- ▶ Item Reports are the right choice when users want to run reports against a selected item.
- ▶ Item Reports can also navigate from the select item to other objects through relationship navigation
- ▶ Designate the report as an Item report
- ▶ Item Reports exists in the context of an item and are accessible to the users only when users select an Item and request for a report.
- ▶ OOTB Default Stylesheets are good enough for most reports. Attach custom stylesheets as required
- ▶ Generate the report



Generating Multi-page reports



- ▶ OOTB stylesheets are available for both Item Reports and Summary Reports.
- ▶ However, these stylesheets produce single page reports.
- ▶ If a generated report requires the report pagination and/or document maps, then custom stylesheets are required which can produce an index.html which can point to other html pages.
- ▶ Such custom stylesheets need to be attached to the Report Definition so that the users can chose that output option while generating the report



Selecting the data sources



- ▶ When using the OOTB Teamcenter Reporting, the extraction of the data for reporting purposes happens through the APIs (Web Services). Hence, all security and access restrictions based on who is initiating the report are honored.
- ▶ When using Teamcenter Reporting and Analytics module or COTS BI Tools, it is possible to go to the database directly.
- ▶ Though going to the database directly is possible, it is not recommended owing to the security and access restrictions imposed by the services/API layer.



Performance Considerations



- ▶ Using Teamcenter Reporting and Analytics Module, administrators can fine tune the execution characteristics of a report to enhance the performance
- ▶ It includes
 - ▶ Generating a report based on caches
 - ▶ Expiration of caches based on predetermined schedules
 - ▶ Generation of caches or reporting snapshots based on predetermined schedules
- ▶ Cache management is done by the COTS reporting tool and such techniques enhance the performance of the Teamcenter servers.



Consistency in look and feel (eg. Logos, Colors)



- ▶ Report definition through wizards and report generation through the stylesheets are highly configurable
- ▶ Using these capabilities, one can control the final appearance of the report in many ways.
- ▶ To maintain consistent look and feel across all the reports generated in an organization, use of style templates is always a best practice.
- ▶ Report designers can make use of these templates while defining the reports.
- ▶ Use of such standard templates ensures that the reports rendered have consistent look and feel in terms of the colors, logos, images.
- ▶ OOTB reports will have a reference to a logo which can be substituted by your organizations logo.



In Production vs In Development



- ▶ Typically, administrators or power users are engaged in the report definition.
- ▶ During the definition phase, admins can set the report definitions to “In Development” stage so that these are not visible to all the users. Once the report is proven and ready for deployment, the report is set to “In Production”.
- ▶ Defining the reports and trying out their executions against a temporary database; and later loading these definitions to a production database is also a recommended best practice.



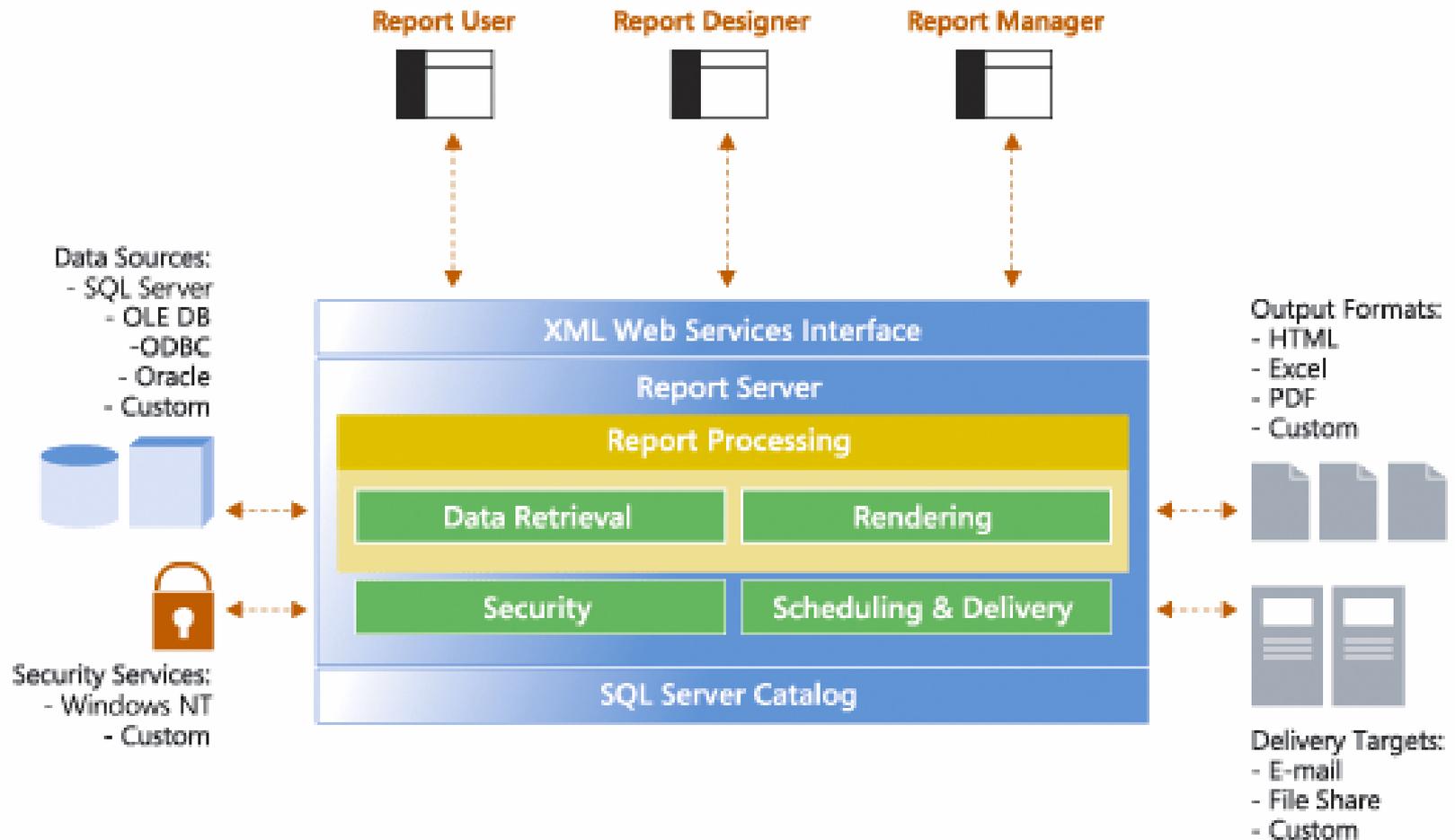
Case Study – Reporting using a COTS SSRS Tool



SSRS Architecture

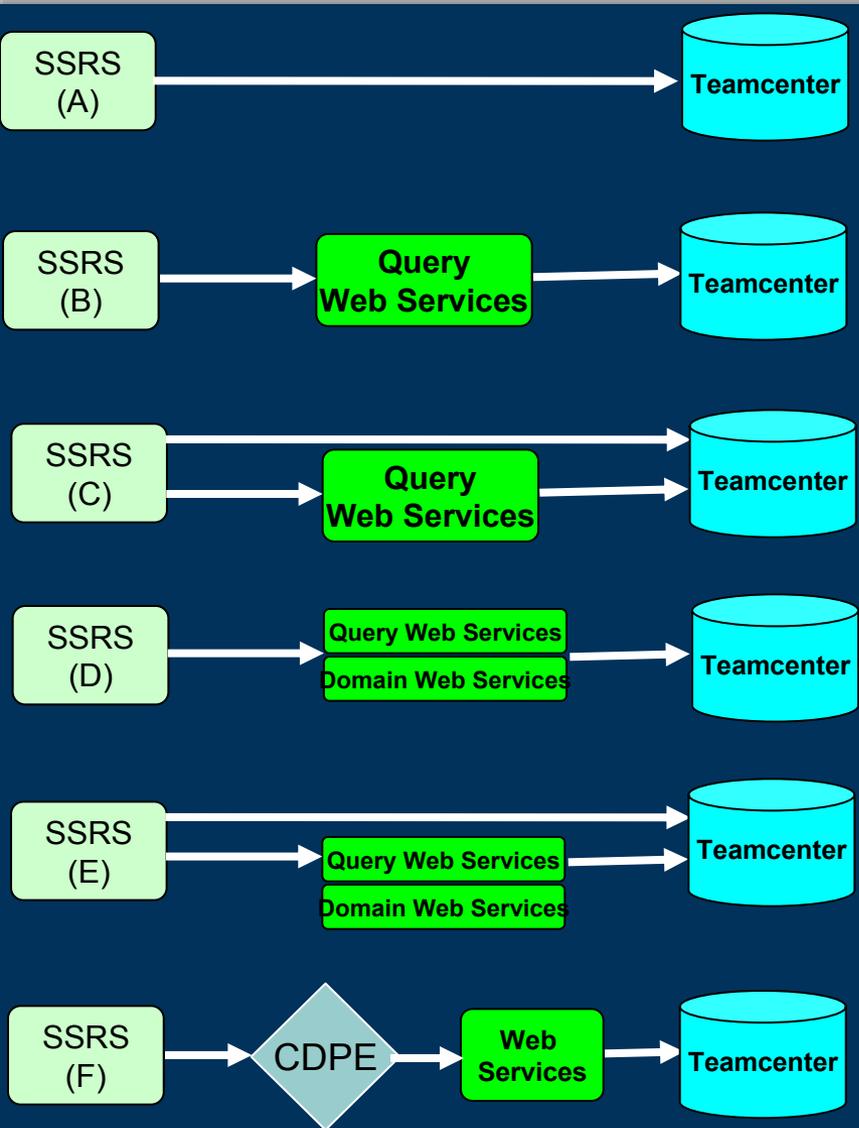


REPORTING SERVICES ARCHITECTURE





Options for getting the data to SSRS From Teamcenter



	Overview	Pros and Cons
A	Default approach in SSRS. Tapping the database directly	Okay for the simple data; But for POM data (which requires the POM layer to impose the business rules), not suitable approach
B	Use the Query web service provided by SOA; All Web Services are URL-addressable	If the data required for reporting can be captured as a Query in portal client, then this approach is suitable.
C	It is a combination of A and B. ie. Some data is obtained from the database directly. And some data is through the Query WS.	Flexible. Aggregation can happen in the reporting tool.
D	Variation to B. If the data required for reporting can not be constructed as TcEngg Queries, then domain-specific web services need to be written	Flexible and Extensible. Additional investment is required to convert an existing API or ITK into a Webservice (2 to 3 days)
E	Variation to D. Data is fetched (1) from database (2) through Query WS (3) through custom WS	Flexible. Aggregation happens in the reporting tool.
F	CDPE = Custom Data Processing Extension. It is an adaptor between the reporting tool and the Teamcenter. Used to handle data mapping issues and credentials/security issues imposed by WS	Highly flexible and extensible. This option requires a custom DLL to be shipped to the customer. This DLL needs to be deployed and preference files need to be configured.



Case Study – Reporting using SSRS



- ▶ Case Study:
 - ▶ Assume that a customer has both Teamcenter Enterprise and Teamcenter Engineering deployed.
 - ▶ One division uses TcEnterprise for their Change Management. However, another division uses Teamcenter Engineering.
 - ▶ Upper management would like a graphical report in PDF format delivered to their email on every Monday morning at 9 AM which answers the following questions?
 - ▶ How many Change Requests are still open?
 - ▶ How many Change Requests are created during the last week?



AVI – Reporting using SSRS



- ▶ AVI shows
 - ▶ Gathering the data from TcEnterprise by connecting to the database
 - ▶ Gathering the data from TcEngineering by connecting through Query Web Service
 - ▶ Aggregation of the data in the reporting tool
 - ▶ Definition and Deployment of the Report into Teamcenter Community
 - ▶ Setting up the scheduled execution of the report and email delivery of the Report
 - ▶ Launching of the Report from Teamcenter Community

SSRS
AVI
(See the AVI
file as a
separate
attachment)



UGS

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process of innovation*



Conclusions



Conclusions



- ▶ OOTB Teamcenter Reporting offers the basic and core capabilities of data extraction based on Queries, Query Builder and Reporting Framework.
- ▶ OOTB Teamcenter Reporting and Analytics module will have integrations with a one preferred COTS Reporting vendor.
- ▶ OOTB Teamcenter Reporting framework is flexible to integrate with different COTS Reporting tools to ensure that our customers are not locked down with a particular vendor
- ▶ In support of this roadmap, a case study illustrating the use of COTS SSRS with Teamcenter Reporting and Analytics module is shown.



Question and Answers

