



IBM Rational Software Conference 2009
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Connecting Requirements to Code with IBM[®] Rational[®] DOORS[®] and Microsoft Visual Studio Team Foundation Server

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Rational. software

Session iRE06

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What are Requirements and Work Items?

■ Understanding Requirements

- ▶ Stakeholder requirement – “Statement of need for one or more stakeholders for a product to be developed”
- ▶ System requirement – “A statement of the operation of the solution to the stated need”
- ▶ Requirements de-scribe a property of the product
 - The problem it solves
 - The way it solves the problem
- ▶ Requirements remain valid after product is finished/delivered

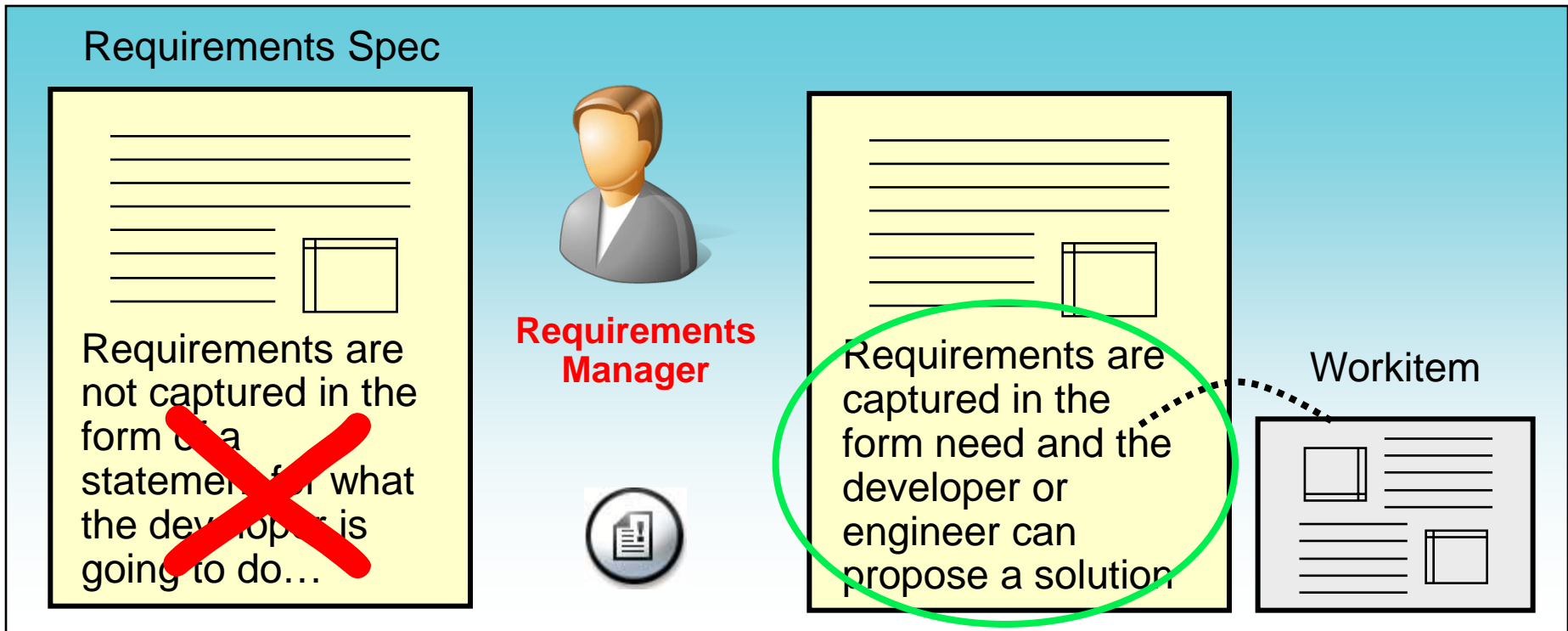
■ Understanding Workitems

- ▶ Workitem –presented with a “To do” list (consisting of one or more workItems)
- ▶ Tasks the user has been asked to do, either explicitly by another person or by the fact that some workflow has reached the point where this user is the next designated player
- ▶ Work Items have a short life span (Not used after product is finished)



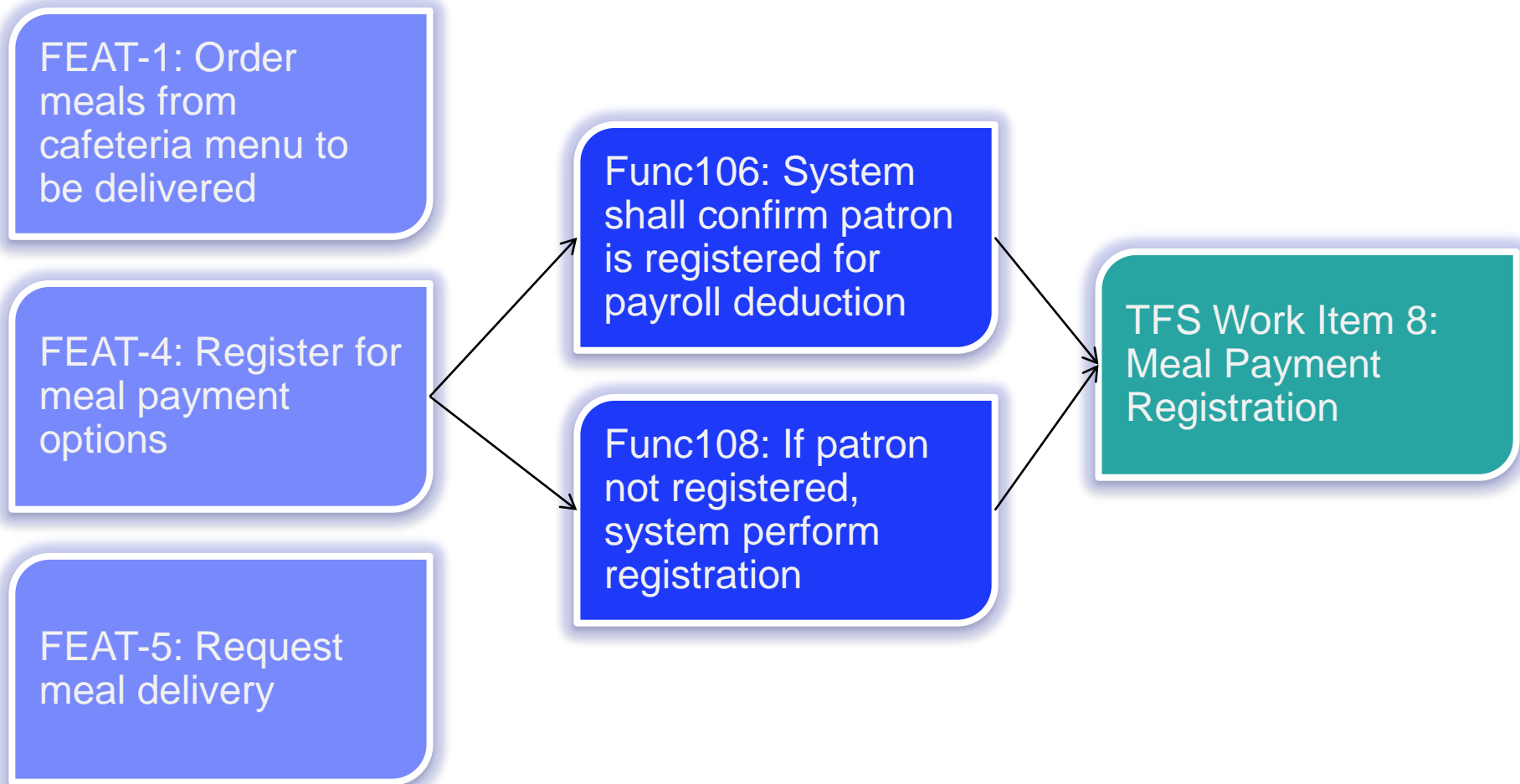
Where Requirements and Work Items Meet

- Work Items have been considered requirements...but it's a hard comparison



- Requirements and workitems run in parallel throughout lifecycle of a project. Combining them would lose the meaning of both as well specific information flexibility

Relating Requirements to Work Items



Relationships: One:One Many:One One:Many

Func106: System shall confirm patron is registered for payroll deduction

Func108: If patron not registered, system perform registration

Func111: Perform credit check if patron is linking credit card.

The screenshot shows the Microsoft Visual Studio interface with the TFS Work Item tool. The work item is titled "Meal Payment Registration" and is of type "Corrective Action". The "Assigned to" field is set to "QUser", "Priority" is "3", and "Severity" is "High". The "Classification" is "Build 23.1.14 Using Stale Data". The "Team Explorer" on the right shows a project structure with "Work Items" expanded. Arrows from the requirement text boxes point to this work item, illustrating the relationship between requirements and code.



Why DOORS and Team Foundation Server?

- Track development progress and quality

- Spot changes, respond quickly

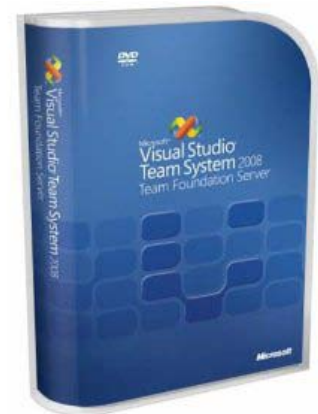
- Implement everything you are supposed to

- Pass an audit



Rational DOORS for MS Team Foundation Server Add On

- DOORS for Microsoft TFS Integration allows users to drive their Visual Studio development from requirements managed in DOORS
 - ▶ Creates active/dynamic external links which are traceable and navigable between requirements held in DOORS and Work Items held in TFS
- Integration between DOORS and Microsoft Team Foundation Server (TFS) allow users to develop within their usual working environments
- DOORS for Requirements Management
 - ▶ Visual Studio for Development
- External IBM Site
 - ▶ <http://www-01.ibm.com/software/awdtools/doors/features/MTFS.html>



Link DOORS requirements to task related work items through the DOORS TFS Add On
Rational DOOR Family

Who's using DOORS-TFS?



IGT in Brief:

- *Wheel of Fortune*[®] – Most popular gaming machine of all time
- Nevada Megabucks[®] – World's 1st wide-area progressive slot system, now starting at a \$10 million jackpot
- S&P 500 since 2001
- Named in "Best Managed Companies in America" – Forbes, 2004

- IGT Advantage[®] casino management system, with exciting Bonusing for players
- IGT Mariposa[®] CRM solution
- EZ Pay[®] ticket-in ticket-out technology
- sbX[™] server-based gaming technology
- Table iD[®] – Table management software, RFID chip tracking, Bonusing and image-based card recognition
- *Multi-Layer Display*[®] (MLD[®]) technology on REELdepth[™] games with 3-D animations

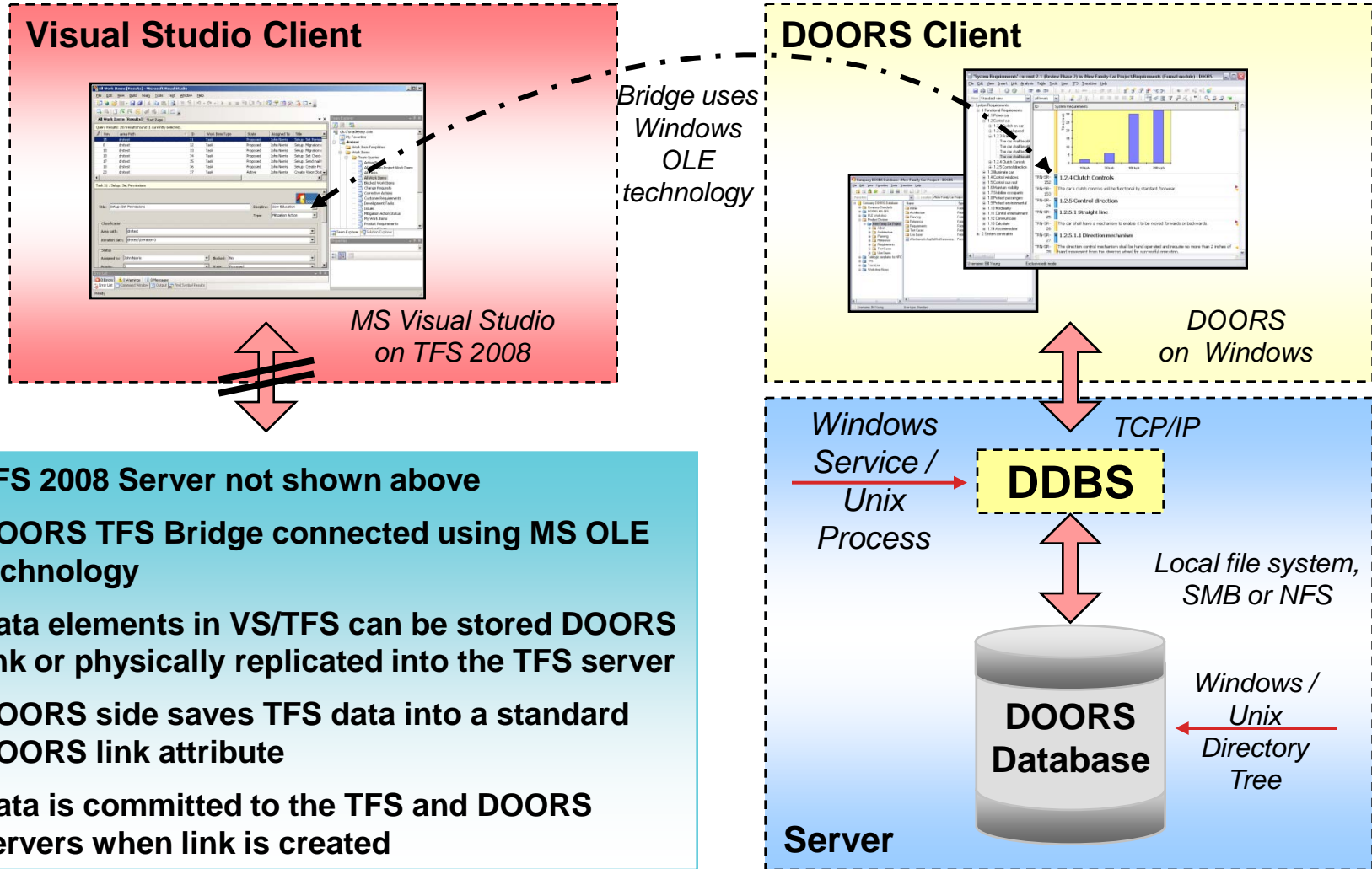
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DOORS-TFS at IGT

- The Integration's main proponent
 - ▶ Vetted integration requirements
 - ▶ Reviewed releases and provided critical user feedback
- Primary Needs
 - ▶ **Audit trail** for future questions as to how or why things were done the way they were
 - ▶ **Eliminate gaps** between requirements and implementation
 - ▶ **Clarify development tasks** – Developers can easily traverse back to source requirements in DOORS
 - ▶ **Status** – Understand implementation status from a Requirements context
 - DOORS users see TFS Work Item Number, Status, and Title
- DOORS-TFS Deployment
 - ▶ DOORS Use Case Requirements ← TFS Scenario Work Items
 - TFS Scenarios are seen as a Requirement proxy

TFS Add On Architecture Overview

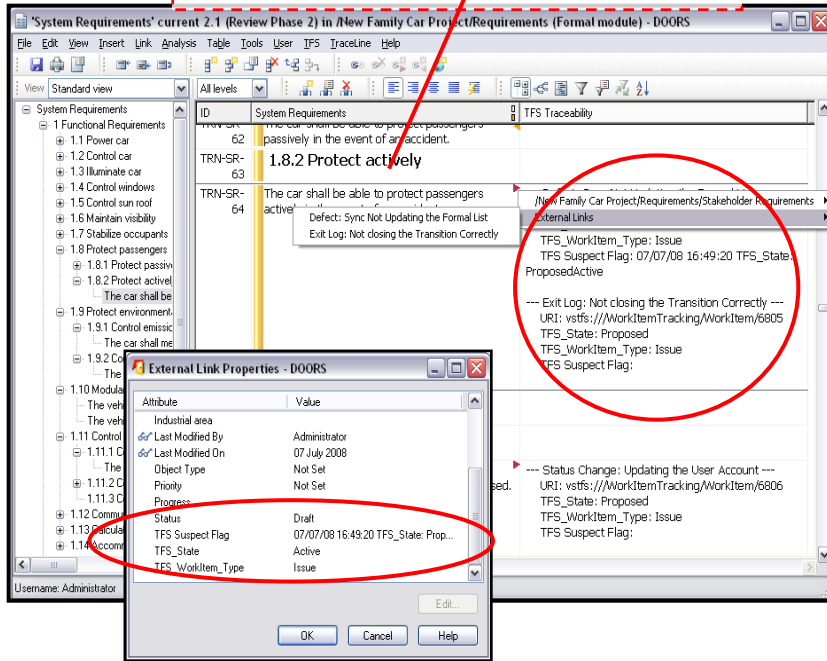


- TFS 2008 Server not shown above
- DOORS TFS Bridge connected using MS OLE technology
- Data elements in VS/TFS can be stored DOORS link or physically replicated into the TFS server
- DOORS side saves TFS data into a standard DOORS link attribute
- Data is committed to the TFS and DOORS servers when link is created

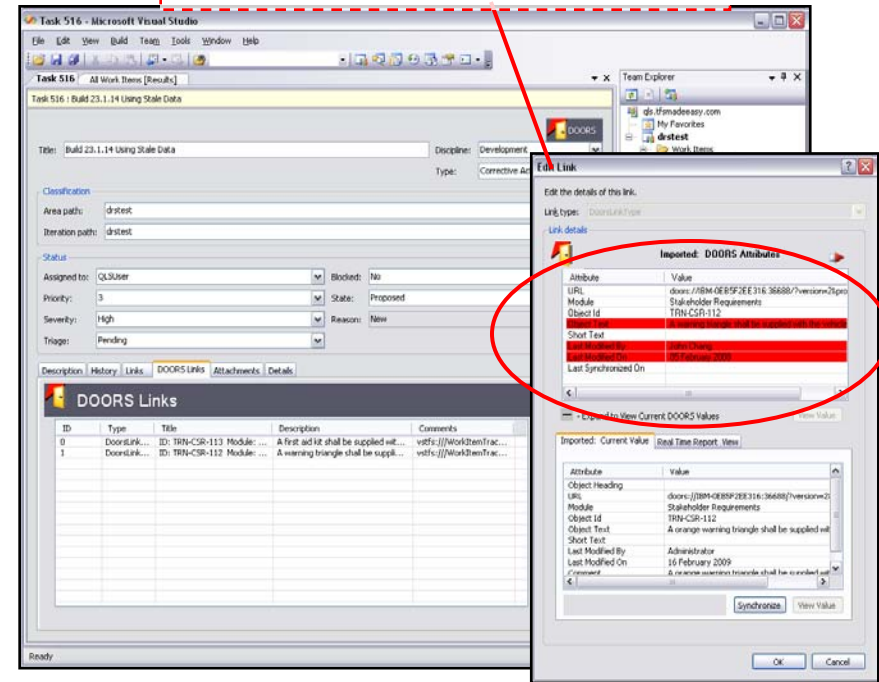


DOORS Requirements Linked to VS Work-Items

DOORS using TFS Interface

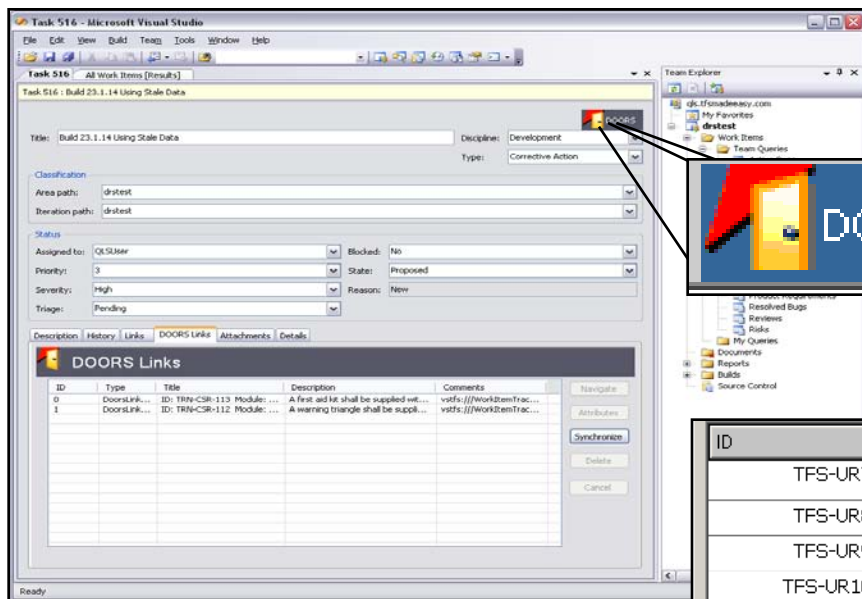


MS Visual Studio



- VS work items can be linked to DOORS requirements
- Data can be displayed and synchronised from VS/DOORS
- Modified DOORS requirements in will show as suspect (red flagged)

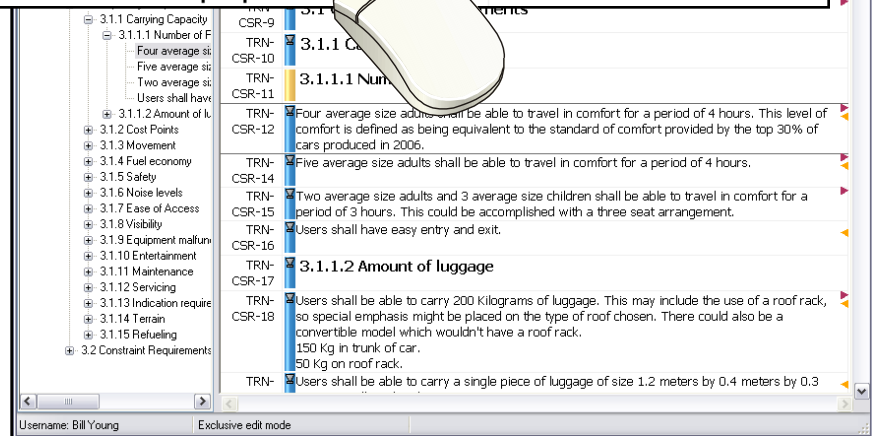
Drag and Drop Linking



Links can be created by simple drag and drop between DOORS object and VS DOORS anchor point (on workitem)

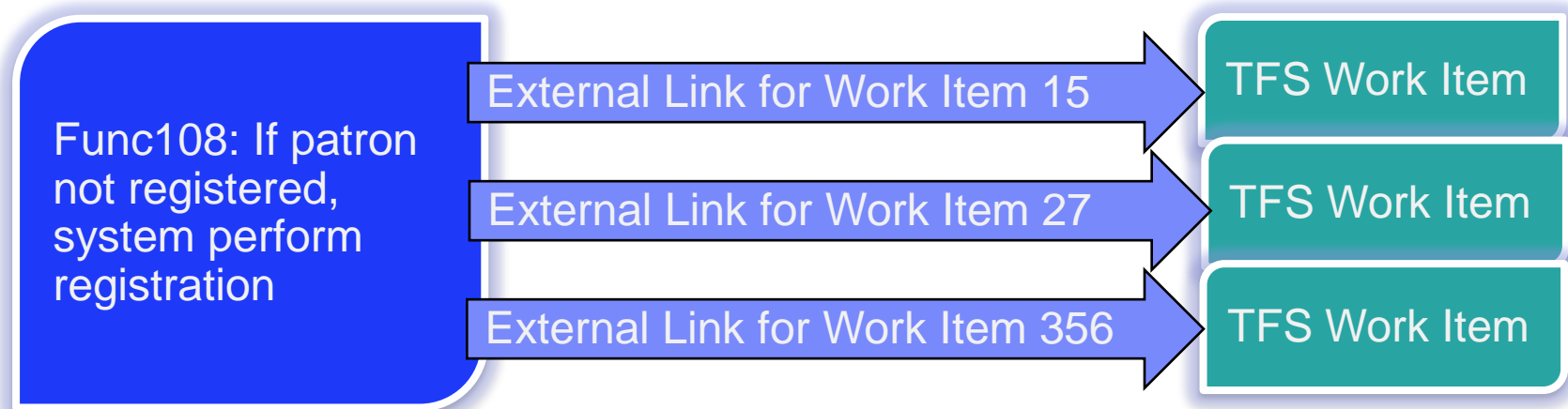
| ID | Car user requirements parsed in |
|----------|------------------------------------|
| TFS-UR7 | 3 Requirements |
| TFS-UR8 | 3.1 Capability Requirements |
| TFS-UR9 | 3.1.1 Carrying Capacity |
| TFS-UR10 | 3.1.1.1 Number of people |

- Links can also be created using the DOORS anchor banner under the DOORS Links tab in Visual Studio
- Drag and drop between both products can be bi-directional



How it Works | External Links

- DOORS saves TFS data into a standard DOORS External link
- TFS saves DOORS Requirement data as a special linked object



Choose Attribute Mapping

- Pick DOORS Attributes to see in Visual Studio
- Pick TFS Work Item Attributes to see in DOORS
- Attributes are **not copied** from Requirements to Task
- TFS attributes are **stored with External Links**

DOORS Requirement: FSR89

- Object Text
- Object ID
- Modified By
- Created By

External Link to TFS Work Item 390

- ID
- Iteration
- Rank
- Discipline

External Link to TFS Work Item 401

- ID
- Iteration
- Rank
- Discipline

Views from DOORS Displaying Workitem Data

- TFS values are stored in DOORS on the **object's external link**
- See **TFS values** via standard DOORS traceability wizard.
- **Suspect link flag**
- **Suspect link** notification can be cleared under TFS menu (or right-click)
- Navigation from **DOORS to VS** is only supported through VS web.

DOORS DXL Traceability Column

The screenshot displays the DOORS interface with several windows open:

- Main Window:** Shows a table of System Requirements with columns for ID, System Requirements, and TFS Traceability. A red dashed box highlights the 'TFS Traceability' column header.
- Object 113 (Saved) - DOORS:** A table showing In/Out links between modules. The 'Ext Out' link is highlighted.
- External Link Properties - DOORS:** A dialog box showing attributes and values for the selected link. Key attributes include:

| Attribute | Value |
|-------------------|--------------------------------------|
| Industrial area | |
| Last Modified By | Administrator |
| Last Modified On | 07 July 2008 |
| Object Type | Not Set |
| Priority | Not Set |
| Progress | |
| Status | Draft |
| TFS Suspect Flag | 07/07/08 16:49:20 TFS_State: Prop... |
| TFS_State | Active |
| TFS_WorkItem_Type | Issue |
- External Links:** A list of links with details such as 'TFS_WorkItem_Type: Issue', 'TFS Suspect Flag: 07/07/08 16:49:20 TFS_State: ...', and 'TFS Suspect Flag: ...'.

A red dashed box at the bottom right labels the 'External Links' area as the **Standard DOORS Link editor**.

Visual Studio Workitems Displaying Requirements

**Visual Studio
DOORS Anchor**

- Navigate – direct user to linked **DOORS object** (even if DOORS isn't running)
- Delete - select one or **more links** for deletion
- Synchronize - attempt to **synchronize** all of the links shown in the display
- Attributes - View all of the imported attributes from DOORS for the **selected link**

| ID | Type | Title | Description | Comments |
|----|--------------------|-----------------------------|----------------------------------|--------------------------|
| 0 | DoorsLinkType | ID: UC1 Module: Novembe... | new use case text 2:51 | vstfs:///WorkItemTrac... |
| 1 | DoorsLinkType | ID: UC5 Module: Novembe... | this is a test for sectio n1 | vstfs:///WorkItemTrac... |
| 2 | DoorsLinkType | ID: UC7 Module: Novembe... | this is an inserted section | vstfs:///WorkItemTrac... |
| 3 | DoorsLinkType | ID: UC11 Module: Novemb... | insert at pos 4 | vstfs:///WorkItemTrac... |
| 4 | Workitem Hyperlink | doors://JOHN3:36679/?ver... | doors://JOHN3:36679/?version=... | vstfs:///WorkItemTrac... |
| 5 | Workitem Hyperlink | doors://JOHN3:36679/?ver... | doors://JOHN3:36679/?version=... | vstfs:///WorkItemTrac... |

Access Custom and Real Time Data

DOORS Link editor in Visual Studio

Imported: DOORS Attributes

| Attribute | Value |
|----------------------|--|
| URL | doors://JOHN3:36690/?version=2&prodID=0&urn= |
| Module | NovemberProjectPackage Process |
| Object Id | UC11 |
| Object Text | insert at pos 4 |
| Short Text | |
| Last Modified By | john |
| Last Modified On | Tuesday, November 04, 2008 |
| Last Synchronized On | |

Expand to View Current DOORS Values View Value

Imported: Current Value Real Time Report View

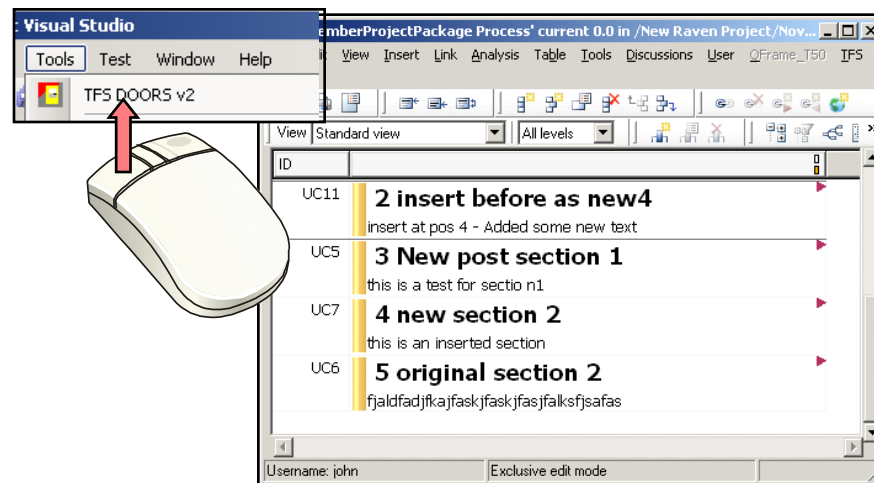
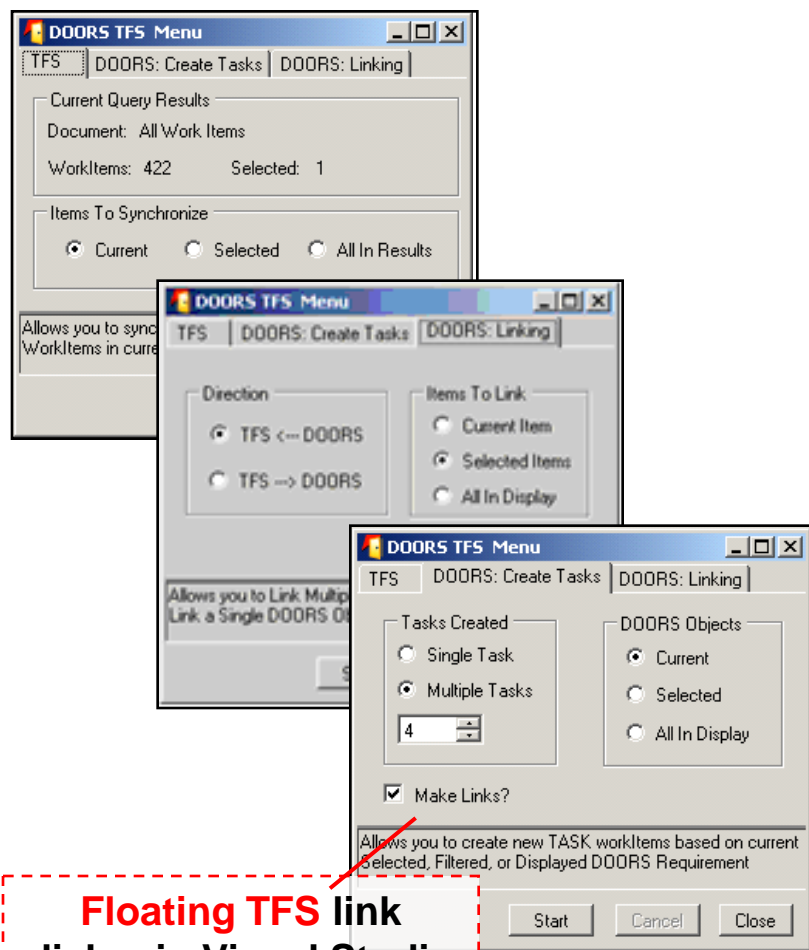
| Attribute | Value |
|------------------|---|
| Object Heading | insert before as new4 |
| URL | doors://JOHN3:36690/?version=2&prodID=0&urr |
| Module | NovemberProjectPackage Process |
| Object Id | UC11 |
| Object Text | insert at pos 4 - Added some new text |
| Short Text | |
| Last Modified By | john |
| Last Modified On | Monday, January 12, 2009 |
| Comment | insert before as new4 |

Synchronize View Value

Synchronize Completed Successfully... OK

- Standard DOORS attributes are **synchronized** to VS
- Custom DOORS attributes can be accessed via the **Real-Time** report
- Suspect** requirement links – red highlights
- Suspect link notification is cleared by running a **link synchronisation**
- Synchronisation **ONLY initiated** through VS

Advanced Console Options



- Link multiple objects in DOORS to TFS workitem
- Generate new TFS task workitems based on Selected/Filtered DOORS objects
- Automatically **generate** tasks (in DOORS) with links
- Specify link directions **between tools**

Floating TFS link dialog in Visual Studio

DEMO

Configure TFS and DOORS for TFS Synchronization

- TFS server requires **configuration** to handle DOORS data (Not Shown Here)
- Each DOORS module **requires integration** configuration through TFS Module
- TFS **sync module** allows user to specify which values from TFS are brought into DOORS
- Last step of DOORS TFS configuration is to create module with **actual attributes**

The screenshot displays the 'TFS DOORS CONFIGURATION' software interface. The top window, titled 'TFS DOORS CONFIGURATION' current 0.0 in /New Family Car Project/Requirements (Formal module) - DOORS, shows a table for mapping DOORS attributes to TFS attributes. A mouse cursor is pointing at the table.

| ID | DOORS Attribute | Maps To | TFS Attribute | TFS Link Display Info Label |
|-------|--|---------|---------------|-----------------------------|
| TFS1 | 1 TFS To DOORS Use this section (1.x) to define which Work Item Fields TFS and Store in DOORS | <--- | | |
| TFS2 | 1.1 | <--- | Title | |
| TFS3 | 1.2 | <--- | ID | |
| TFS4 | 1.3 | <--- | Rev | |
| TFS14 | 1.4 | <--- | Severity | |
| TFS15 | 1.5 | <--- | State | |
| TFS16 | 1.6 | <--- | Priority | |
| TFS5 | 2 DOORS To TFS Use this section (2.x) to define which DOORS Object attributes to copy from DOORS and Store in TFS. | ---> | | |

The bottom window shows a list of requirements with their TFS WorkItem states:

| Requirement ID | Description | TFS WorkItem State |
|----------------|--|--------------------|
| TRN-CSR-114 | 3.2.5 Fuel input | Proposed |
| TRN-CSR-115 | The car shall be fully compatible with the fuel input mechanism provided by the outlets where fuel will be acquired. | Proposed |
| TRN-CSR-116 | The user shall be able to completely refuel in less than 4 minutes or at the maximum time as defined by the fuel refill mechanism. | Proposed |
| TRN-CSR-117 | 3.2.6 Company constraints | Proposed |
| TRN-CSR-118 | There will be an automatic break point at the end of year 2 when all research, early development and early prototyping will be assessed. | Proposed |

Both windows show 'Username: Bill Young' and 'Exclusive edit mode' at the bottom.

Download DOORS-TFS Integration

- Download DOORS-TFS 2.0

<https://www-112.ibm.com/software/howtobuy/softwareandservices>

- *DOORS for Microsoft Team Foundation Server Add On is **Free of Charge:***

<http://www.ibm.com/developerworks/forums/forum.jspa?forumID=1504&start=0>

- Discuss DOORS-TFS

<http://www.ibm.com/developerworks/forums/forum.jspa?forumID=1504&start=0>

Questions



Richard Watson
Senior Product Manager

Justin Mulhearn
Requirements Technical Specialist

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