



IBM Software Group | IMS

Web 2.0: Transforming IMS Enterprise SOA to Web Oriented Architecture

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Agenda

- IMS and Web 2.0
- RESTful Services
- Transform IMS Transactions into RESTful Services
- Using RESTful Services
- Info 2.0
 - InfoSphere Mashup Hub
 - Lotus Mashups
- IMS integration with Info 2.0

IMS and Web 2.0

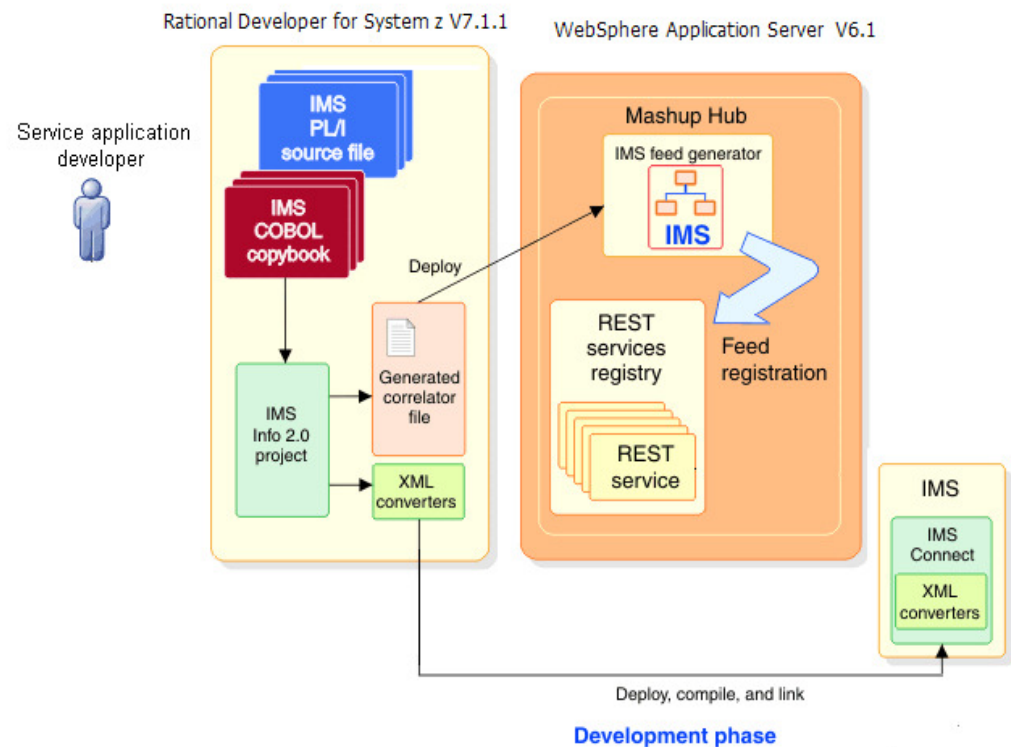
- IMS - A hierarchical database and transaction manager
- Web 2.0 – Treating the “web as a platform”
- Web Services are applications that run on the web
- Most significant internet applications utilize a database
- Goal: Transform IMS Transaction into RESTful Services

RESTful Services

- Web Services come in two flavors
 - Web Oriented Architecture (WOA)
 - Service Oriented Architecture (SOA)
- RESTful Services are based on WOA
- IMS already supports SOA through WebSphere and its SOAP Gateway, so why support WOA and RESTful Services?
- RESTful Services are lightweight web services
 - Call through HTTP Methods (GET, POST, etc)
 - Clients can be a simple browser
 - The service will output text, HTML, or XML
 - Does not require WSDL or XSD files like SOA

Transform IMS Transactions into RESTful Services

- The IMS RESTful Service tool will generate an IMS RESTful Services Handler and XML Converters for a given IMS transaction
- The IMS RESTful Service tool will require metafiles generated from Rational Developer for System z
 - NOTE: Rational Developer for System z is provided at no cost with IMS V10



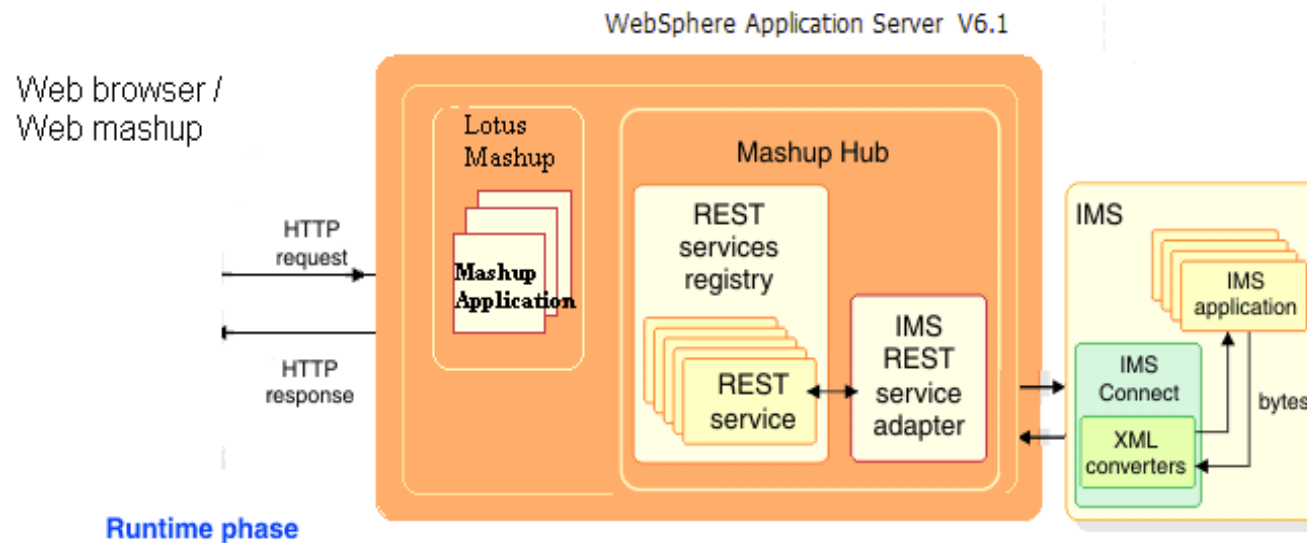
IMS RESTful Service Handler and Adapter

■ IMS RESTful Service

- Takes the name/value pairs from the HTTP Server and constructs an XML input message
 - Message is sent to the IMS RESTful Service Adapter
- Receives XML output from the RESTful Service Adapter
- Sends XML output back to the client or converts it into an ATOM feed
- Generated for each IMS transaction

■ IMS Restful Service Adapter

- Establishes connection with IMS Connect
 - Adds the IRM header to XML messages going to IMS Connect
 - Removes IRM header from XML message going to the IMS RESTful Service Handler



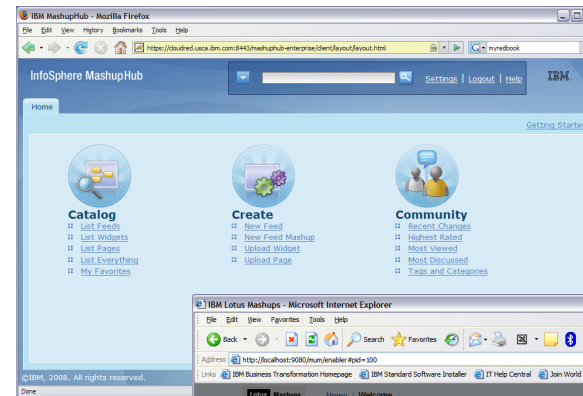
Using RESTful Services

- RESTful services can easily be consumed by different users
 - Due to the simple HTTP method interface
- RESTful services can be extended through the use of integration tools
 - i.e., InfoSphere Mashup Hub, Yahoo Pipes
- RESTful services can be a part of mashups to enhance usability
 - i.e., Lotus Mashups, QEDWiki

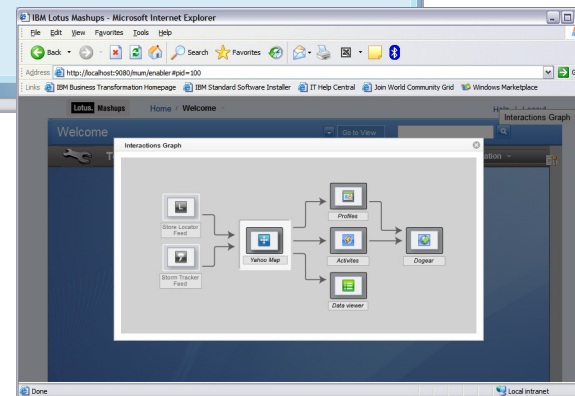
i info 2.0

- “Web 2.0 Goes to Work”
- Info 2.0 as described by Lauren Cooney, Manager Open Source Technology
 - “Info 2.0 is a technology for simplified integration of data and content via Information Mashups.”
 - “Info 2.0 is focused on enterprise users, so now mashups can be not only created for external users, but also for departmental users within a company”

Info 2.0



InfoSphere MashupHub



Lotus Mashups

InfoSphere Mashup Hub

- A sub-project of Info 2.0
- Takes data from various source
 - RESTful services (XML) , RSS feeds, ATOM feeds, and Excel
- Contains different built-in operators to manipulate the inputs and create a new RESTful service/feed
 - Operators: ForEach, Merge, Filter, Sort, Group, Union, etc.

Lotus Mashups

- A sub-project of Info 2.0
- Mashup maker to integrate a variety of web services onto a web page
- Contains many built in widgets

IMS and



- “Unleash” enterprise data with Web 2.0
 - Protect customers investment in IMS asset (data)
 - Transforming IMS assets into IMS RESTful services will “unleash” enterprise data to be consumed as XML/ATOM feeds in the Web 2.0 Community
- Remix IMS asset
 - Info 2.0 tools will extend usability of enterprise data by adding the ability to remix and mashup the data
 - Quick develop and deploy cycle (1 developer takes 5-10 days to create the mashup)

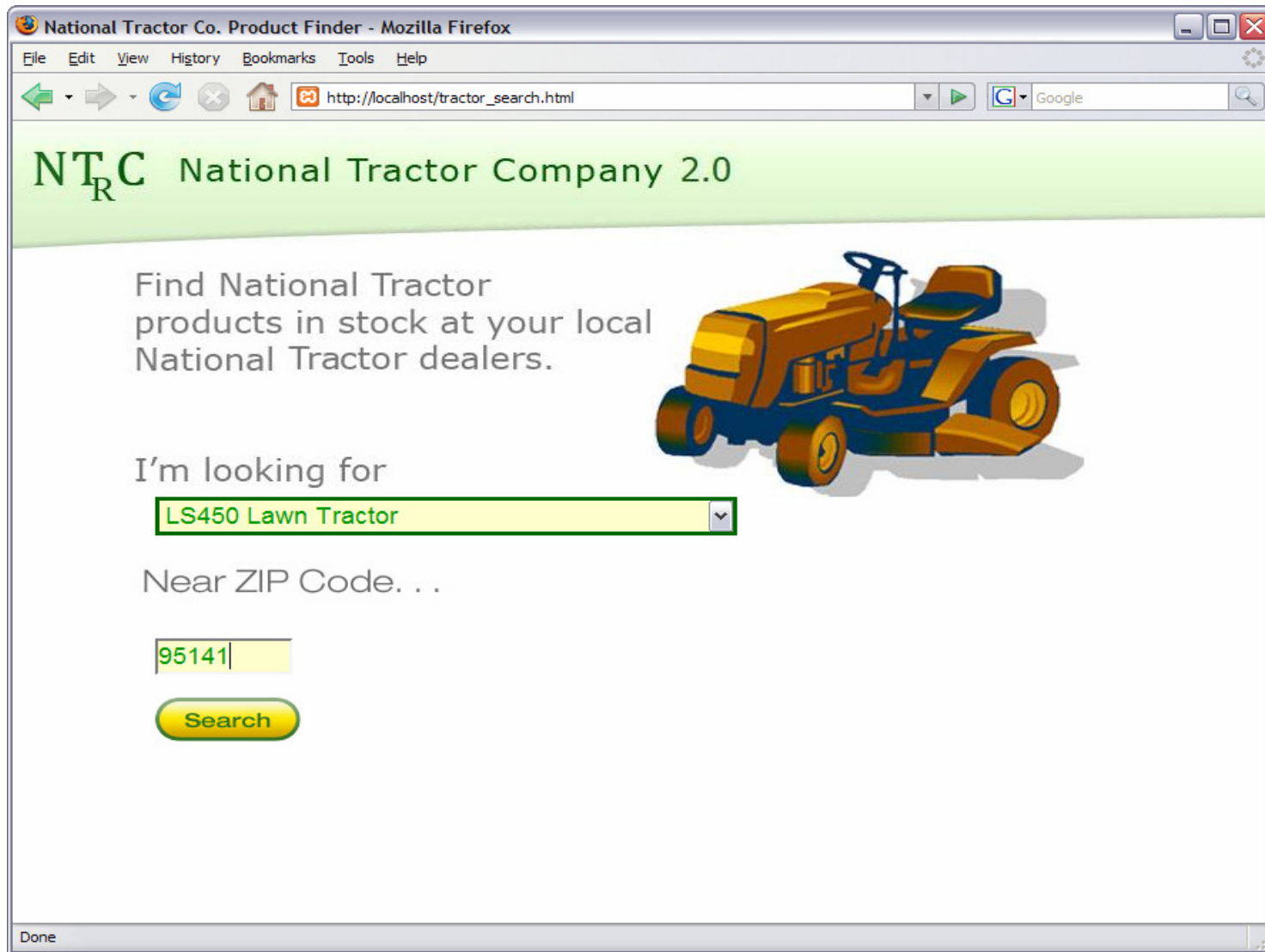
National Tractor Company 2.0 “Unleashed”

- National Tractor Company 2.0 Demo
 - Demonstrate that IMS transaction can be exposed as services to the Web and be easily consumed by other Web Services and Clients
 - Show how to integrate with the Info 2.0 integration tool (Mashup Hub) to create a new RESTful service from various sources
 - Show how the mashup maker (QEDWiki) is used to integrate a variety of services onto a Web page

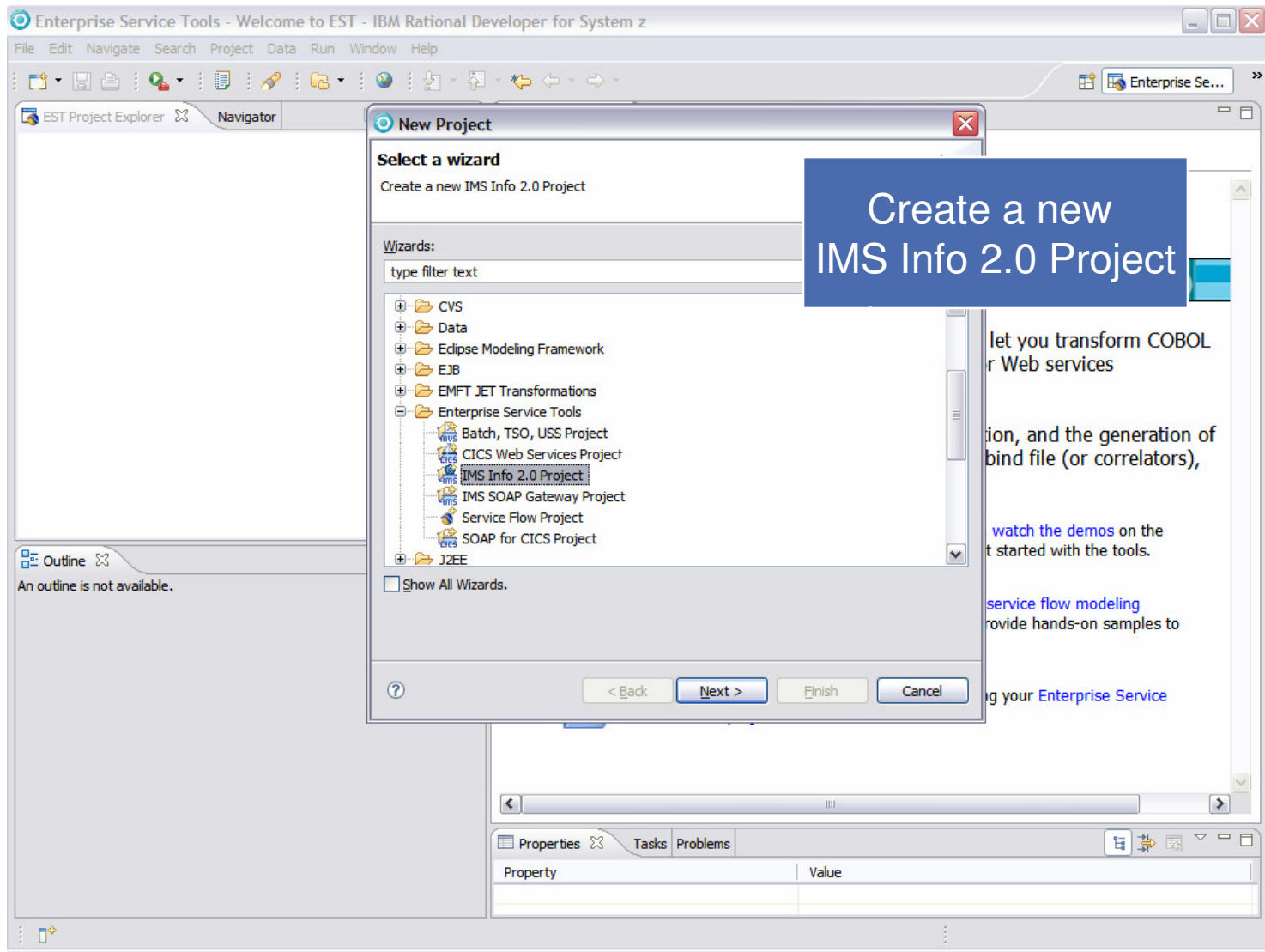
National Tractor Company 2.0 Scenario

- **“Frustrated Customer”**
 - Customer wants to buy a tractor and goes to the National Tractor Company website to search for local dealers
 - The website does not show stock information for the dealers
 - Customer needs to call or visit each dealer to confirm that the tractor is in stock
 - After many unsuccessful attempts, customer becomes very frustrated
- **National Tractor Company IMS Assets**
 - Uses IMS to manage its product inventory
 - Owns an IMS Transaction that returns product inventory for a specific product fro mall dealers worldwide
 - Wants to leverage other Web 2.0 services to create a local product inventory finder without having to reprogram their IMS Cobol Application

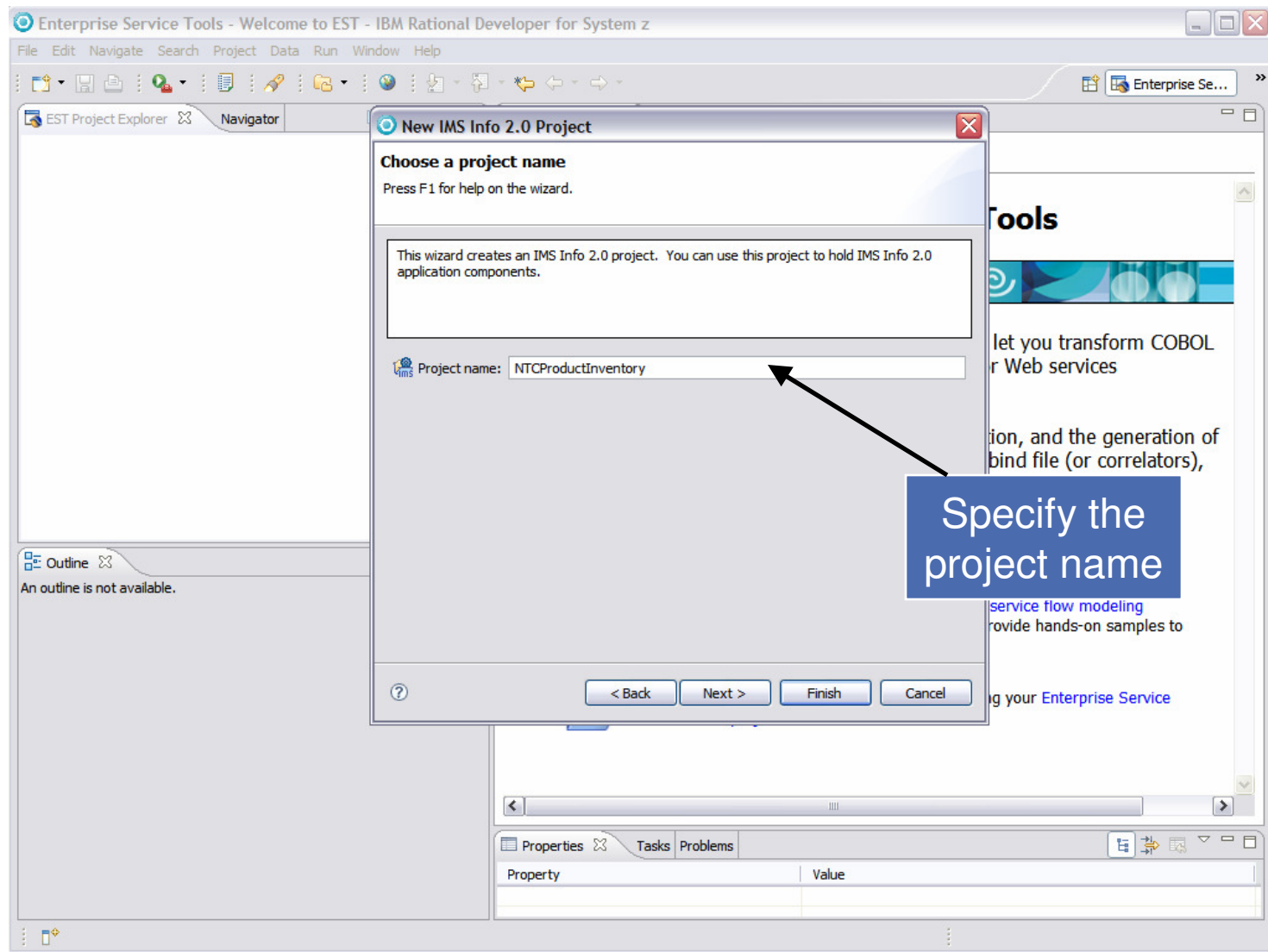
National Tractor Co. Product Inventory Finder



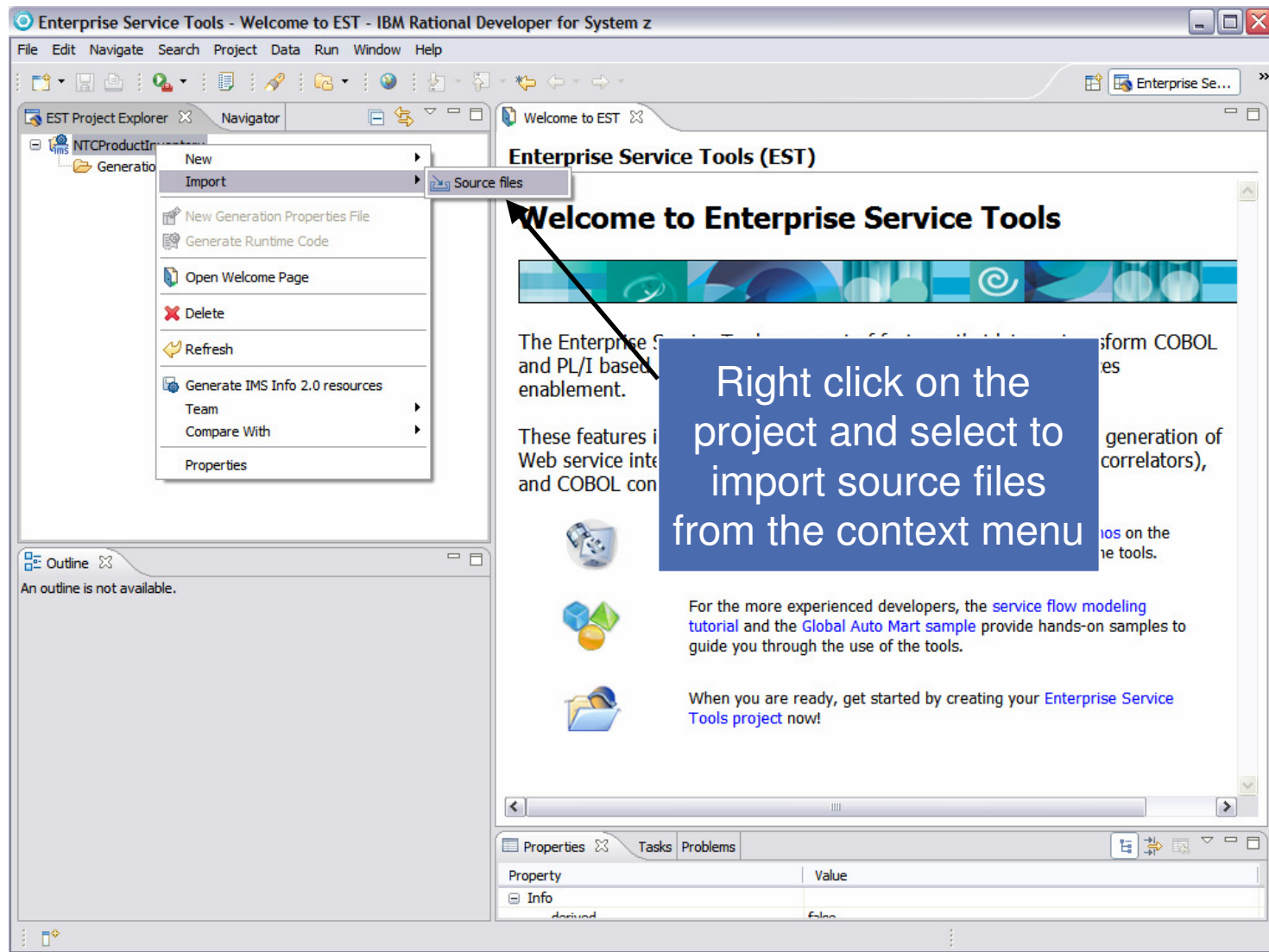
Rational Developer for System z - Metafile Generation



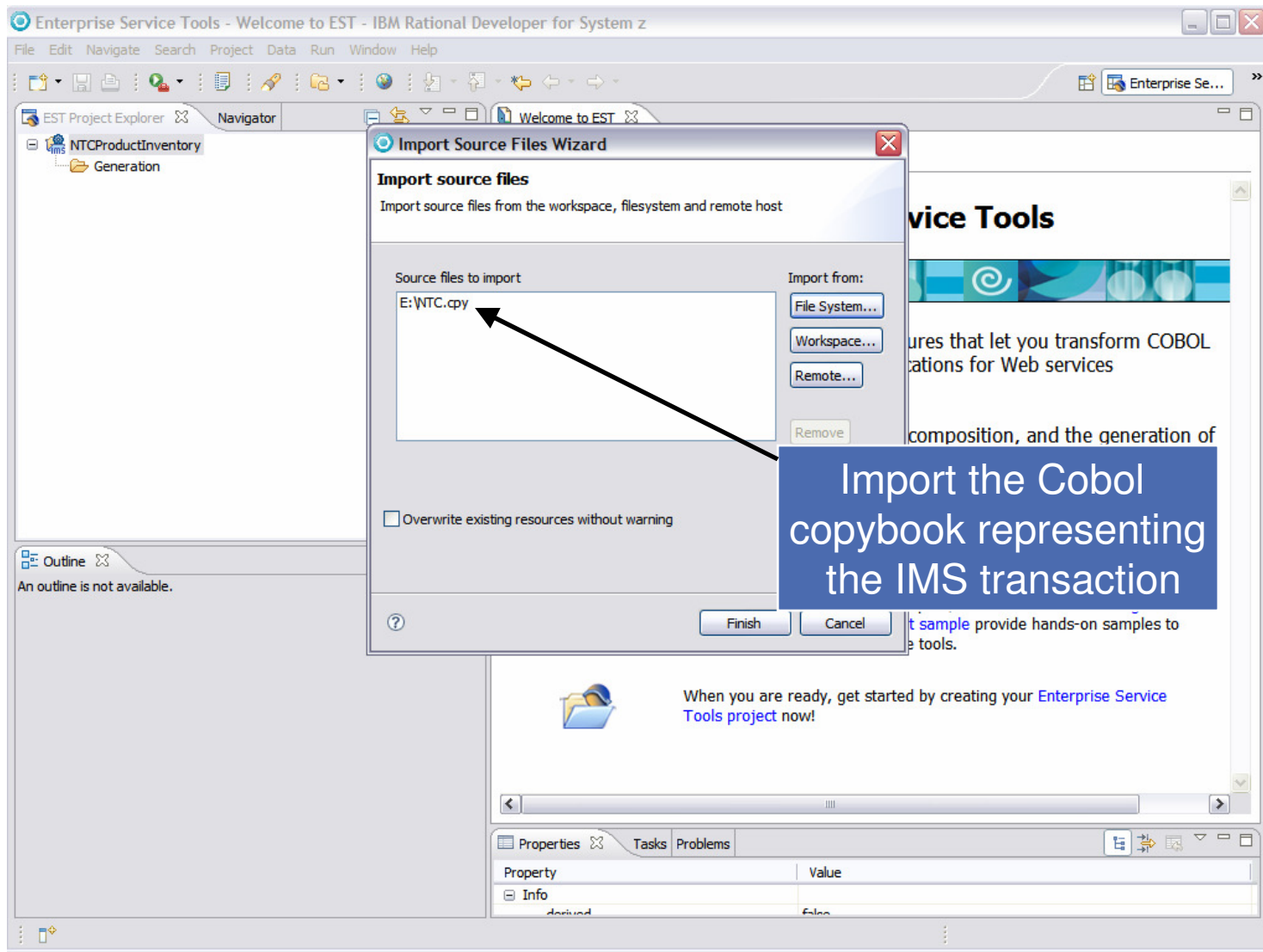
Rational Developer for System z - Metafile Generation (cont)



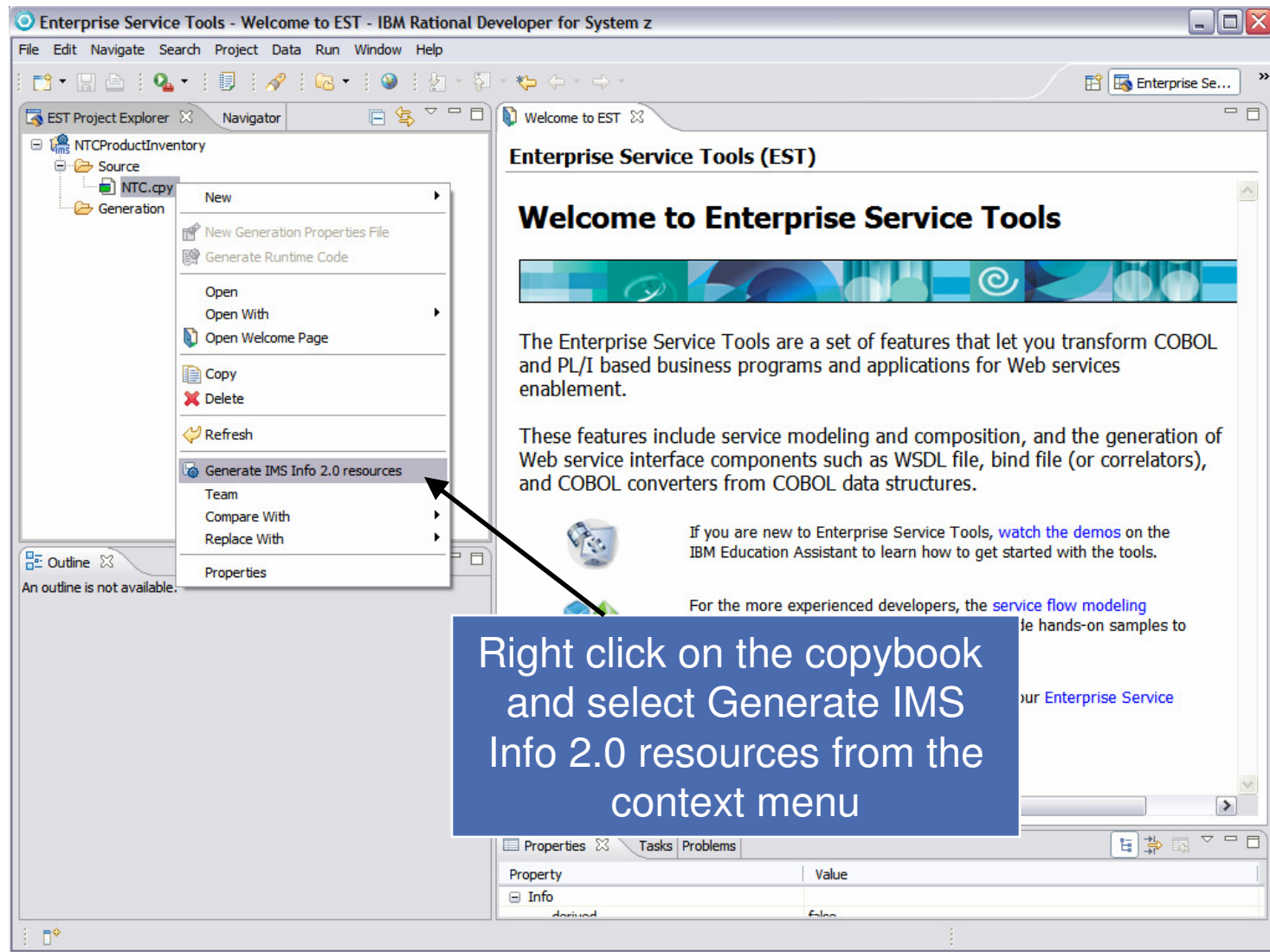
Rational Developer for System z - Metafile Generation (cont)



Rational Developer for System z - Metafile Generation (cont)



Rational Developer for System z - Metafile Generation (cont)



Rational Developer for System z - Metafile Generation (cont)

Enterprise Service Tools - Welcome to EST - IBM Rational Developer for System z

File Edit Navigate Search Project Data Run Window Help

EST Project Explorer Navigator

NTCProductInventory

- Source
- NTC.cpy
- Generation

Welcome to EST

Enterprise Service Tools (EST)

Enterprise Service Tools

atures that let you transform COBOL applications for Web services

d composition, and the generation of WSDL file, bind file (or correlators), structures.

Service Tools, [watch the demos](#) on the [earn how to get started with the tools.](#)

developers, the [service flow modeling tutorial](#) and the [Global Auto Mart sample](#) provide hands-on samples to guide you through the use of the tools.

When you are ready, get started by creating your [Enterprise Service Tools project](#) now!

Specify options to start a web service wizard

Host runtime: IMS Info 2.0

Development scenario: Create New Service Interface (bottom-up)

Application mode: Service Provider

Conversion type: Compiled XML Conversion

Scenario description:

Generate a Web service description and runtime specific XML message processing from a high level language data structure. You can use this option when you expose an application program as a service provider.

Save generation properties

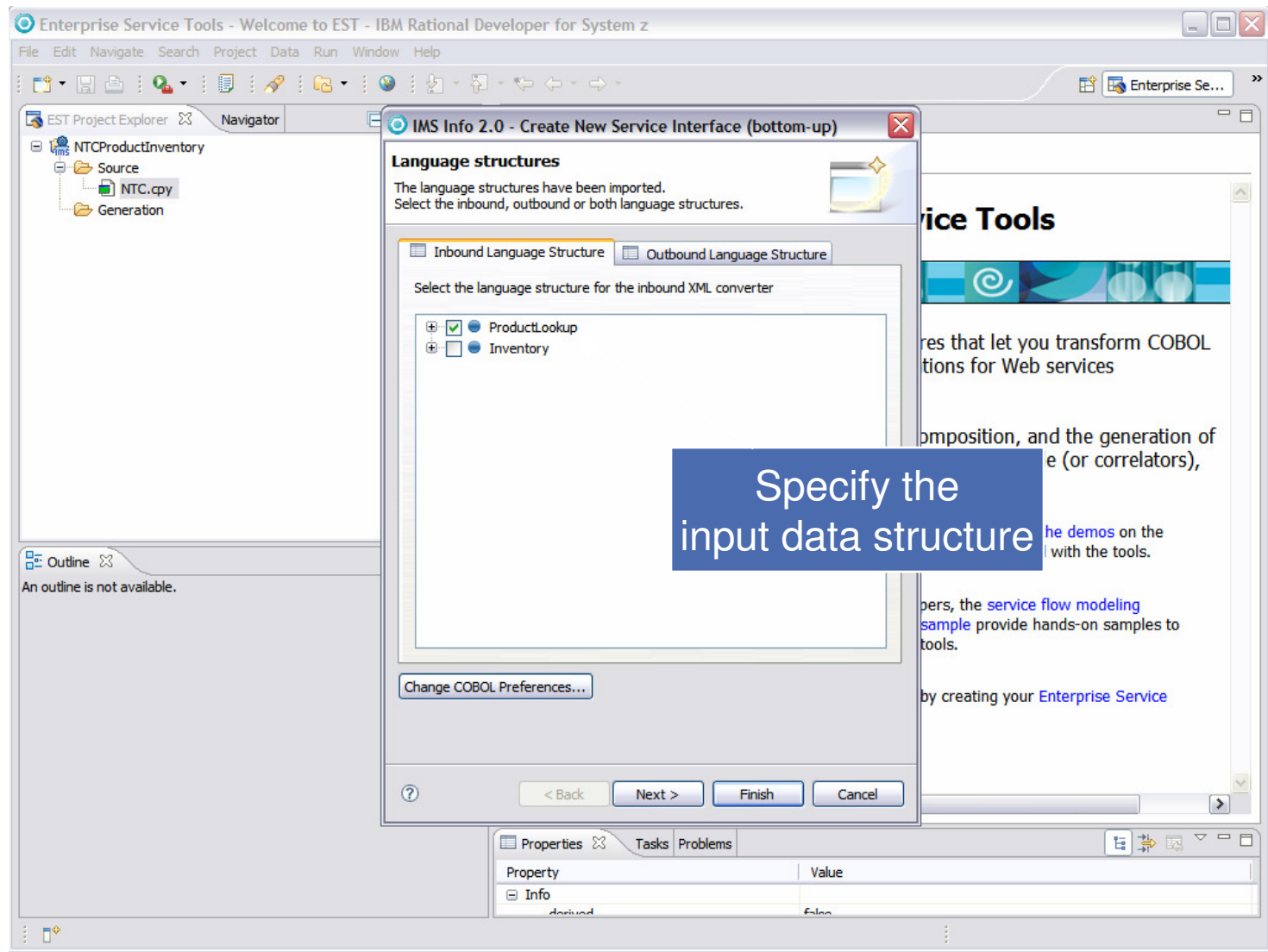
Start Cancel

Click Start to accept the default settings

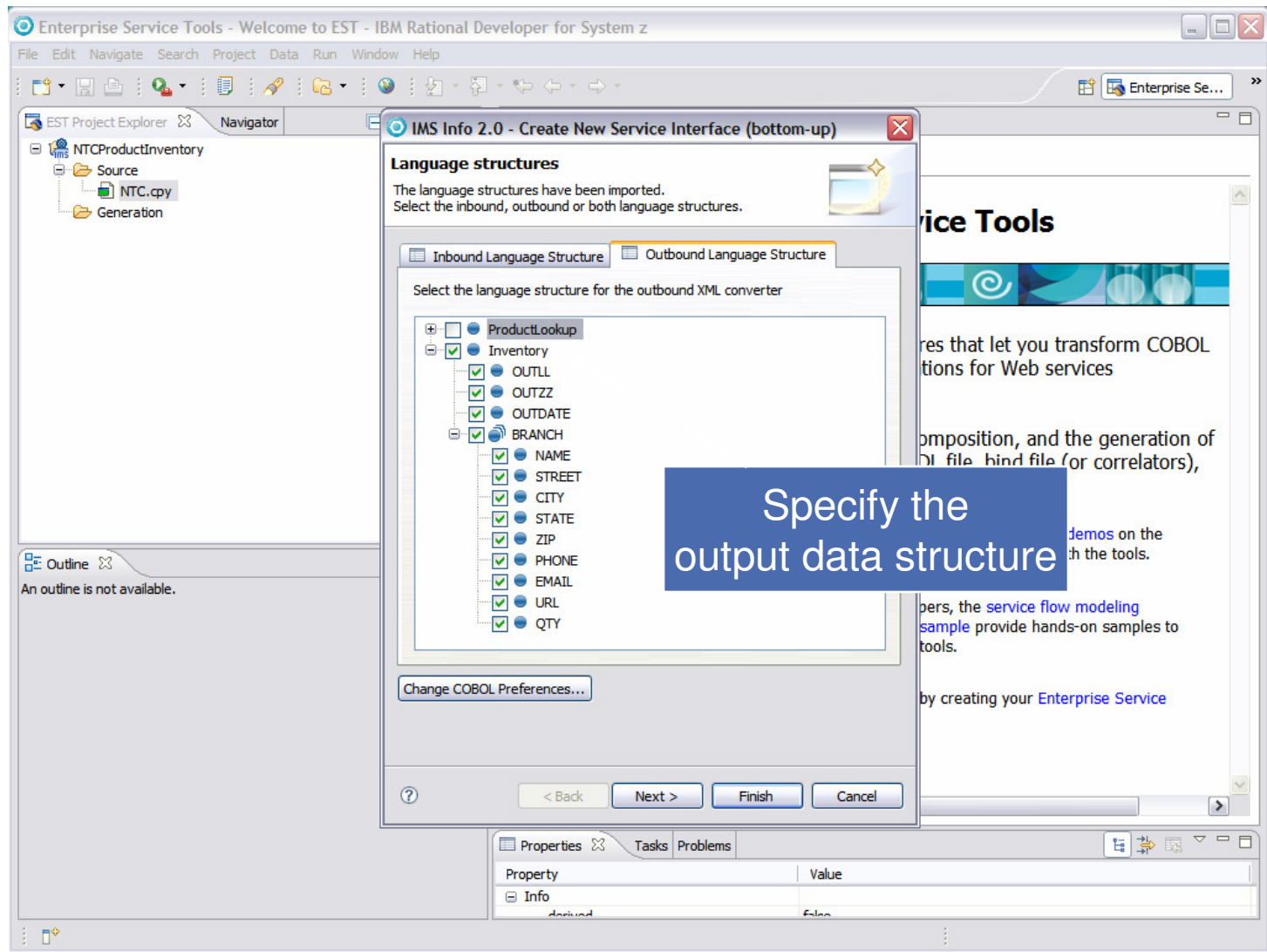
Properties Tasks Problems

| Property | Value |
|----------|---------|
| Info | defined |
| | False |

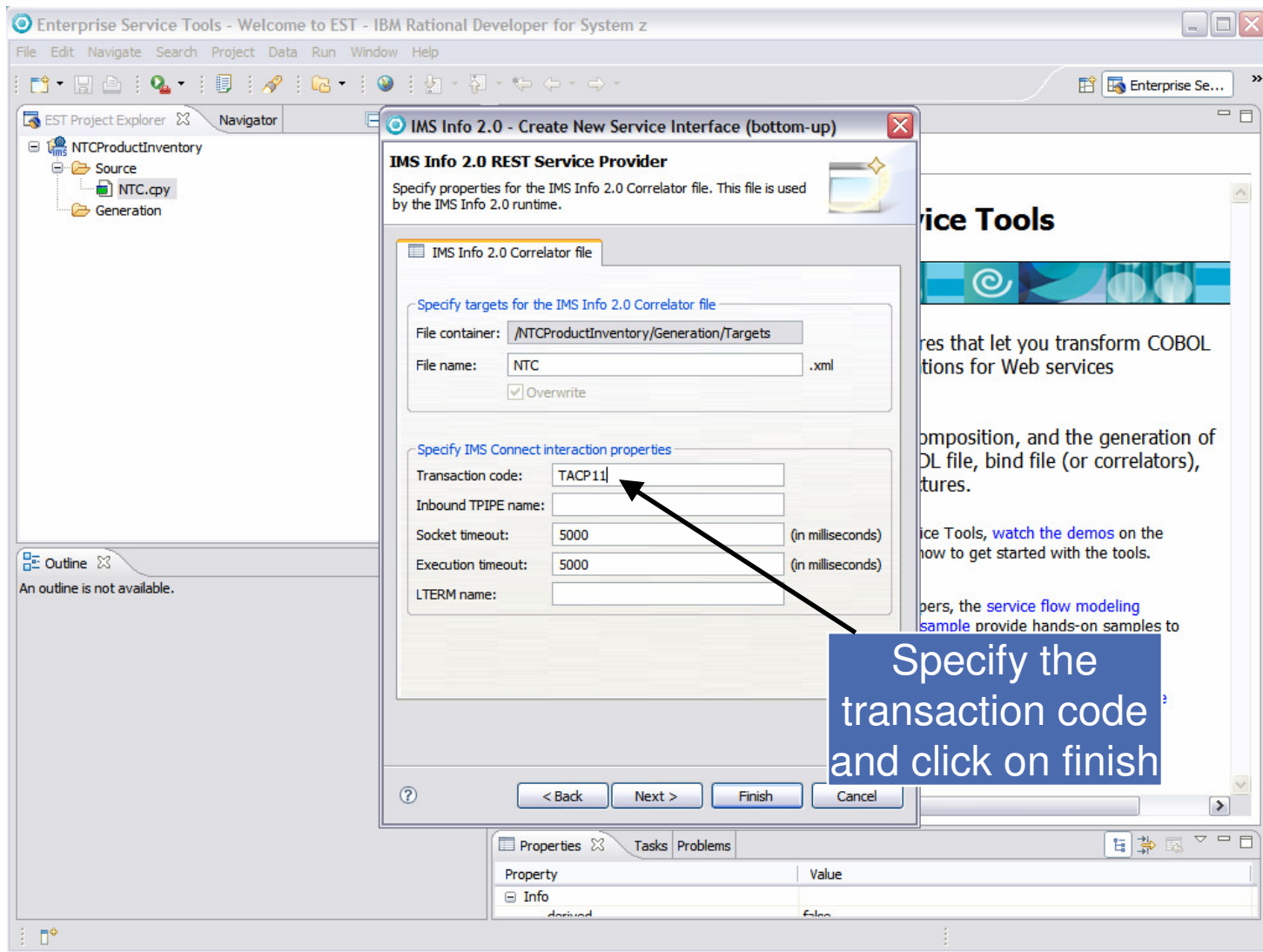
Rational Developer for System z - Metafile Generation (cont)



Rational Developer for System z - Metafile Generation (cont)



Rational Developer for System z - Metafile Generation (cont)



Rational Developer for System z - Metafile Generation (cont)

The screenshot shows the Enterprise Service Tools (EST) interface within IBM Rational Developer for System z. The window title is "Enterprise Service Tools - Welcome to EST - IBM Rational Developer for System z". The menu bar includes File, Edit, Navigate, Search, Project, Data, Run, Window, and Help. The EST Project Explorer on the left shows a project named "NTCProductInventory" with folders for "Source" and "Targets". Under "Source", there are files: "Container.xml", "PlatformProperties.xml", and "ServiceSpecification.xml". Under "Targets", there are files: "NTC.xml", "NTCD.cbl", "NTCI.xsd", and "NTCO.xsd". A black arrow points from the "NTC.xml" file in the Targets folder to a blue callout box. The main area displays a "Welcome to Enterprise Service Tools (EST)" message. A blue callout box is overlaid on the message, containing the text: "Generated IMS Info 2.0 correlator to be sent to Mashup Hub". Another blue callout box is overlaid on the bottom left of the main area, containing the text: "Generated xml converter to be installed on IMS Connect". The bottom of the window shows a Properties, Tasks, and Problems pane with a table structure.

Generated IMS Info 2.0 correlator to be sent to Mashup Hub

Generated xml converter to be installed on IMS Connect

Welcome to Enterprise Service Tools (EST)

Welcome to Enterprise Service Tools

at let you transform COBOL for Web services

These features include service modeling and composition, and the generation of Web service interface components such as WSDL file, bind file (or correlators), and COBOL converters from COBOL data structures.

new to Enterprise Service Tools, [watch the demos](#) on the [Installation Assistant](#) to learn how to get started with the tools.

For more experienced developers, the [service flow modeling](#) and the [Global Auto Mart sample](#) provide hands-on samples to guide you through the use of the tools.

When you are ready, get started by creating your [Enterprise Service Tools project](#) now!

| Property | Value |
|----------|-------|
| | |
| | |

Mashup Hub – Service Creation

IBM MashupHub - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html myredbook

InfoSphere MashupHub

Settings | Logout | Help IBM

Home

Getting Started

Catalog

- List Feeds
- List Widgets
- List Pages
- List Everything
- My Favorites

Create

- New Feed**
- New Feed Mashup
- Upload Widget
- Upload Page

Community

- Recent Changes
- Highest Rated
- Most Viewed
- Most Discussed
- Tags and Categories

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Done cloudred.usca.ibm.com:8443

Mashup Hub – Service Creation (cont)

The screenshot shows the InfoSphere MashupHub interface in a Mozilla Firefox browser window. The address bar shows the URL: <https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html>. The page title is "InfoSphere MashupHub". The navigation menu includes "Home" and "New Feed". The main content area is titled "Select the feed data source" and features a search icon and a search bar. Below the search bar, there is a list of data sources categorized into "enterprise" and "departmental". The "enterprise" category is expanded, showing options: LDAP, SAP, IBM Information Server, Domino, Relational, Web Service, TDI, pureXML Document, and IMS. The "IMS" option is highlighted with a mouse cursor. A callout box with a blue background and white text says: "Select the Enterprise data sources Category and choose IMS as the Data Source". An arrow points from the callout box to the "IMS" option. At the bottom of the page, there are buttons for "Previous", "Cancel", and "Next". The footer contains the text "© IBM Corp., 2008. All rights reserved." and the status bar shows "Done" and the URL "cloudred.usca.ibm.com:8443".

Select the feed data source

* Source:

- enterprise**
 - LDAP
 - SAP
 - IBM Information Server
 - Domino
 - Relational
 - Web Service
 - TDI
 - pureXML Document
 - IMS
- departmental**
 - Excel or CSV
 - XML Document
 - Feed Registration
 - MS Access Document

Previous Cancel Next

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Done cloudred.usca.ibm.com:8443

Mashup Hub – Service Creation (cont)

InfoSphere MashupHub - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html myredbook

InfoSphere MashupHub Settings Logout Help

Home Untitled 29

Creating an IMS Feed

Fields with an asterisk (*) are required.

Host Information:

- * Host Name or IP Address:
- * Port:
- * Data Store Name:

Generated Correlator File:

- * File Path:

Security Credentials:

Previous Cancel Next

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Done cloudred.usca.ibm.com:8443

Specify the connection information for IMS Connect

Import the IMS Info 2.0 correlator file generated by Rational Developer for System z

Mashup Hub – Service Creation (cont)

InfoSphere MashupHub - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://cloudred.usca.ibm.com/myredbook

InfoSphere MashupHub

Settings | Logout | Help

IBM

Home Untitled 29

Creating an IMS Feed

Select the parameters to hide:

| Parameter Name | Hide | Default Value |
|----------------|--------------------------|----------------------|
| inll | <input type="checkbox"/> | <input type="text"/> |
| inzz | <input type="checkbox"/> | <input type="text"/> |
| trcd | <input type="checkbox"/> | <input type="text"/> |
| uid | <input type="checkbox"/> | <input type="text"/> |
| pid | <input type="checkbox"/> | <input type="text"/> |

Previous Cancel Next

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Done cloudred.usca.ibm.com:8443

Enabling a parameter will expose it to the service consumer

Default values can be set for input parameters

IMS Transaction Parameters

Mashup Hub – Service Creation (cont)

The screenshot shows the InfoSphere MashupHub interface in a Mozilla Firefox browser window. The main content area displays a service titled "IMS National Tractor Company Demo" by Richard Tran. Below the title, there is a note that the service may not be available at all times and a URL: <http://cloudred.usca.ibm.com:8080/mashuphub-enterprise/client/plugin/generate/entr>. The "Details" section shows the following information:

| | |
|------------------|-----------------|
| Source: | IMS |
| Version: | 1.0 |
| Documentation: | None |
| Times Accessed: | 0 |
| Last Updated: | 4/1/08 10:35 AM |
| Categories: | None |
| Related Entries: | None |

On the right side of the interface, there is an "Actions" menu with the following options:

- View Feed
- Add to Lotus Mashups
- Report Abuse
- Edit Information
- Edit Feed Source
- Delete

A blue callout box with white text and a black arrow pointing to the "View Feed" option contains the following text:

Click on View Feed to view the newly created IMS RESTful service's xml feed output

Mashup Hub – Service Creation (cont)

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<branches>
  <branch>
    <name>INDUSTRIAL EQUIPMENT LAWN N GARDEN</name>
    <address>4100 Bohannon Dr Menlo Park CA 94025</address>
    <phone>(650) 926-6</phone>
    <email>allturf@some</email>
    <url/>
    <quantity>1</quantity>
  </branch>
  <branch>
    <name>TRACTOR</name>
    <address>50 California St # 1500 San Francisco CA 94111</address>
    <phone>(415) 439-5255</phone>
    <email>mytractor@tractormed.com</email>
    <url/>
    <quantity>3</quantity>
  </branch>
  <branch>
    <name>TRACTOR MEDIC CO.</name>
    <address>523 Moraga Way Orinda CA 94563</address>
    <phone>(925) 631-0711</phone>
    <email>mytractor@tractormed.com</email>
    <url/>
    <quantity>2</quantity>
  </branch>
  <branch>
    <name>TRACTOR EQUIPMENT CO.</name>
    <address>19997 Shadow Creek Cir Castro Valley CA 94552</address>
  </branch>
</branches>
```

Done

The IMS RESTful Service can now be accessed and consumed through this URL

Mashup Hub – Compositing Services

InfoSphere MashupHub - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html myredbook

InfoSphere MashupHub

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- New Feed
- New Feed Mashup
- Upload Widget
- Upload Page

Community

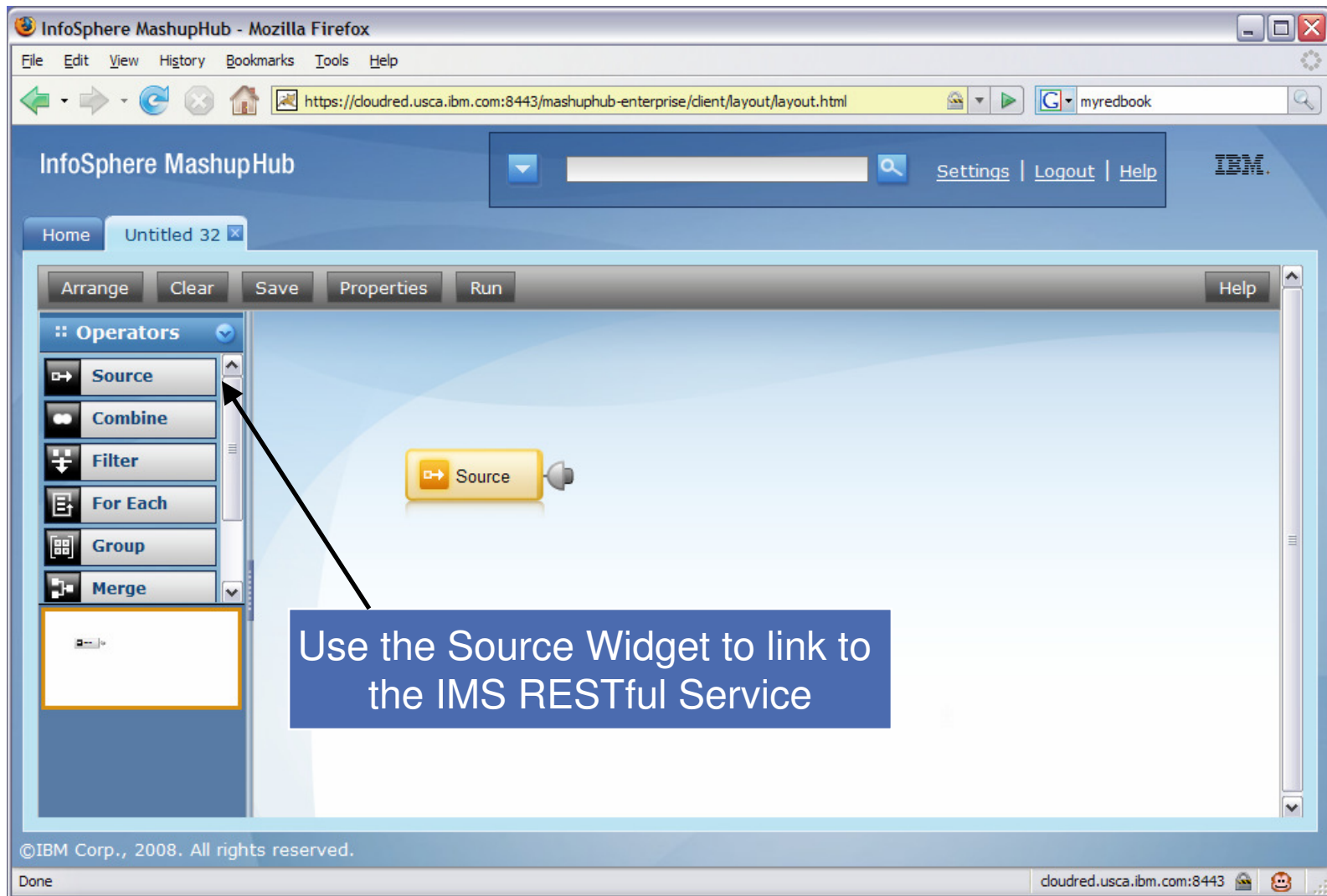
- Recent Changes
- Highest Rated
- Most Viewed
- Most Discussed
- Tags and Categories

Click on New Feed Mashup to enter the Mashup editor

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Done cloudred.usca.ibm.com:8443

Mashup Hub – Compositing Services (cont)



Mashup Hub – Compositing Services (cont)

The screenshot shows the InfoSphere MashupHub interface in Mozilla Firefox. The browser address bar displays the URL: `https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html`. The page title is "InfoSphere MashupHub".

On the left side, there is a sidebar with "Operators" including Source, Combine, Filter, For Each, Group, and Merge. The "Source" operator is selected.

The main area shows "Details for the Source operator (source4114)". Under the "Properties" tab, the "Name" is "source4114". The "Source" section has two options: "Url" (with a text input field containing `http://rss.cnn.com/rss/cnn_topstories.rss` and a "Load" button) and "From Catalog" (with a text input field and a "Browse" button). An arrow points from the "Browse" button to a callout box.

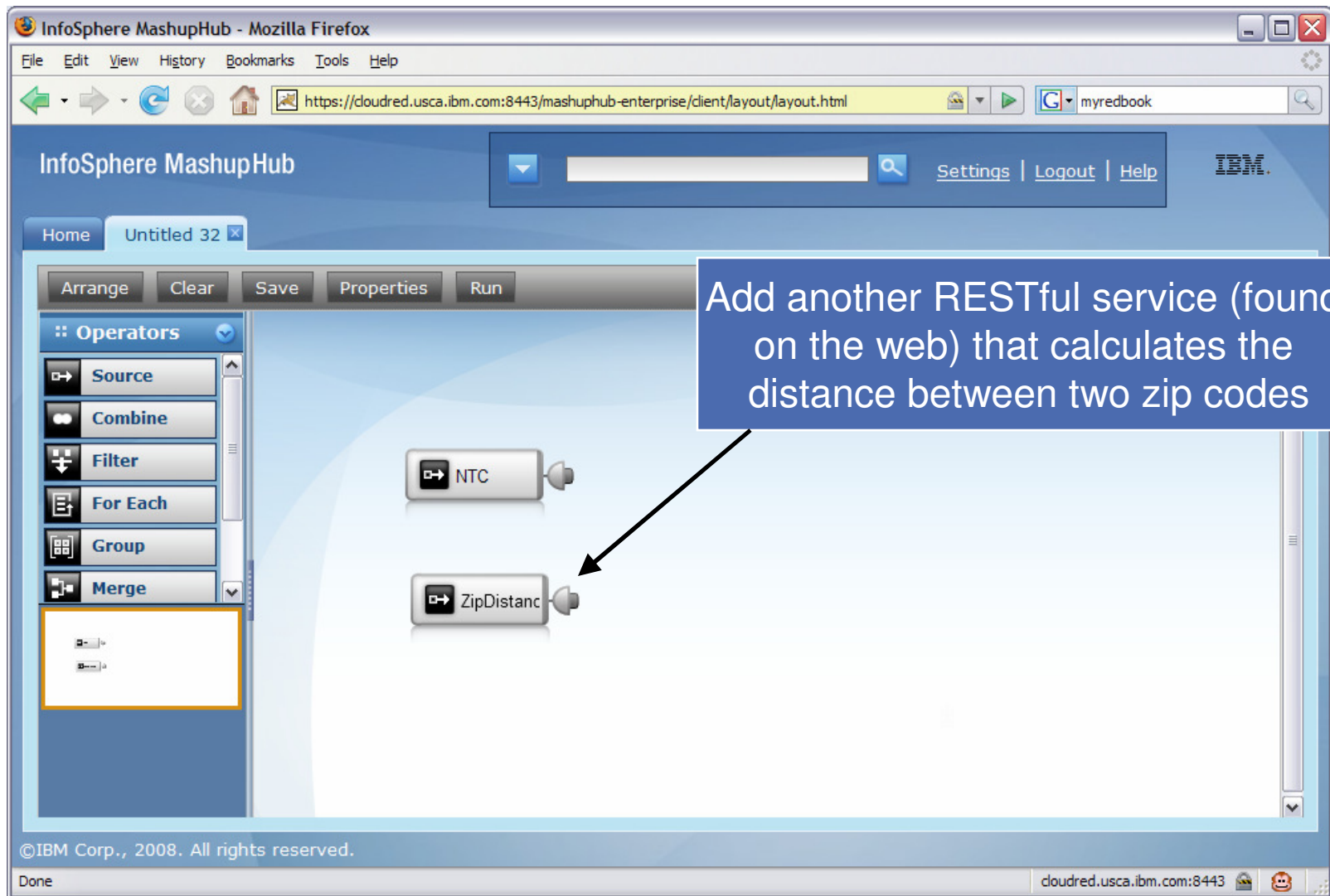
At the bottom of the "Details" panel, there is a table with two columns: "URL Parameters" and "Value".

Two callout boxes provide additional context:

- A blue box at the top right says: "National Tractor Co. Dealer Information taken from the IMS RESTful service".
- A blue box at the bottom center says: "IMS RESTful Service can be found in the feed catalog".

The footer of the browser window shows "© IBM Corp., 2008. All rights reserved." and "Done". The status bar at the bottom right shows the URL `cloudred.usca.ibm.com:8443`.

Mashup Hub – Compositing Services (cont)



The screenshot shows the InfoSphere MashupHub interface in a Mozilla Firefox browser window. The address bar displays the URL: `https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html`. The interface includes a search bar, navigation links for 'Settings', 'Logout', and 'Help', and a main workspace with a toolbar containing 'Arrange', 'Clear', 'Save', 'Properties', and 'Run'. On the left, there is a sidebar with 'Operators' including 'Source', 'Combine', 'Filter', 'For Each', 'Group', and 'Merge'. The main workspace contains two service components: 'NTC' and 'ZipDistanc'. A blue callout box with white text points to the 'ZipDistanc' component, stating: 'Add another RESTful service (found on the web) that calculates the distance between two zip codes'. The footer of the browser window shows '©IBM Corp., 2008. All rights reserved.' and the status bar displays 'Done' and the URL 'cloudred.usca.ibm.com:8443'.

Mashup Hub – Compositing Services (cont)

The screenshot shows the InfoSphere MashupHub interface in a Mozilla Firefox browser window. The browser address bar displays the URL: <https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html>. The interface includes a menu bar (File, Edit, View, History, Bookmarks, Tools, Help) and a toolbar (Arrange, Clear, Save, Properties, Run). A left sidebar contains a list of operators: Source, Combine, Filter, For Each, Group, and Merge. The main workspace shows a workflow diagram with three widgets: 'NTC', 'ZipDistance', and 'For Each'. The 'For Each' widget is highlighted in yellow and is connected to both 'NTC' and 'ZipDistance'. A blue callout box with white text points to the 'For Each' widget and contains the following text: "Use the **For Each** Widget to run the **ZipDistance** service to calculate the distance between every Zip Code in the **National Tractor Co. Dealer Inventory** with a User Specified Zip Code". The status bar at the bottom shows "©IBM Corp., 2008. All rights reserved." and "Done".

Use the **For Each** Widget to run the **ZipDistance** service to calculate the distance between every Zip Code in the **National Tractor Co. Dealer Inventory** with a User Specified Zip Code

Mashup Hub – Compositing Services (cont)

The screenshot shows the InfoSphere MashupHub interface in Mozilla Firefox. The browser address bar displays `https://cloudred.usca.ibm.com:8443/mas`. The main workspace contains a workflow diagram with the following components:

- NTC** widget
- ZipDistance** widget
- For Each** widget, which receives input from both NTC and ZipDistance.
- Filter** widget, which receives input from the For Each widget.

A blue callout box with white text contains the instruction: "Use the **Filter** Widget to filter out all dealers located beyond 100 miles from the specified zip code". Two black arrows point from this callout box to the **Filter** widget in the workflow diagram. On the left side, the **Operators** panel is visible, with the **Filter** widget highlighted in a yellow box.

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Done cloudred.usca.ibm.com:8443

Mashup Hub – Compositing Services (cont)

InfoSphere MashupHub - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://cloudred.usca.ibm.com:8443/mashuphub-enterprise/client/layout/layout.html myredbook

InfoSphere MashupHub Settings | Logout | Help IBM.

Home Untitled 32

Arrange Clear Save Properties Run Help

Operators

- Source
- Combine
- Filter
- For Each
- Group
- Merge

NTC

ZipDistanc

For Each

Filter

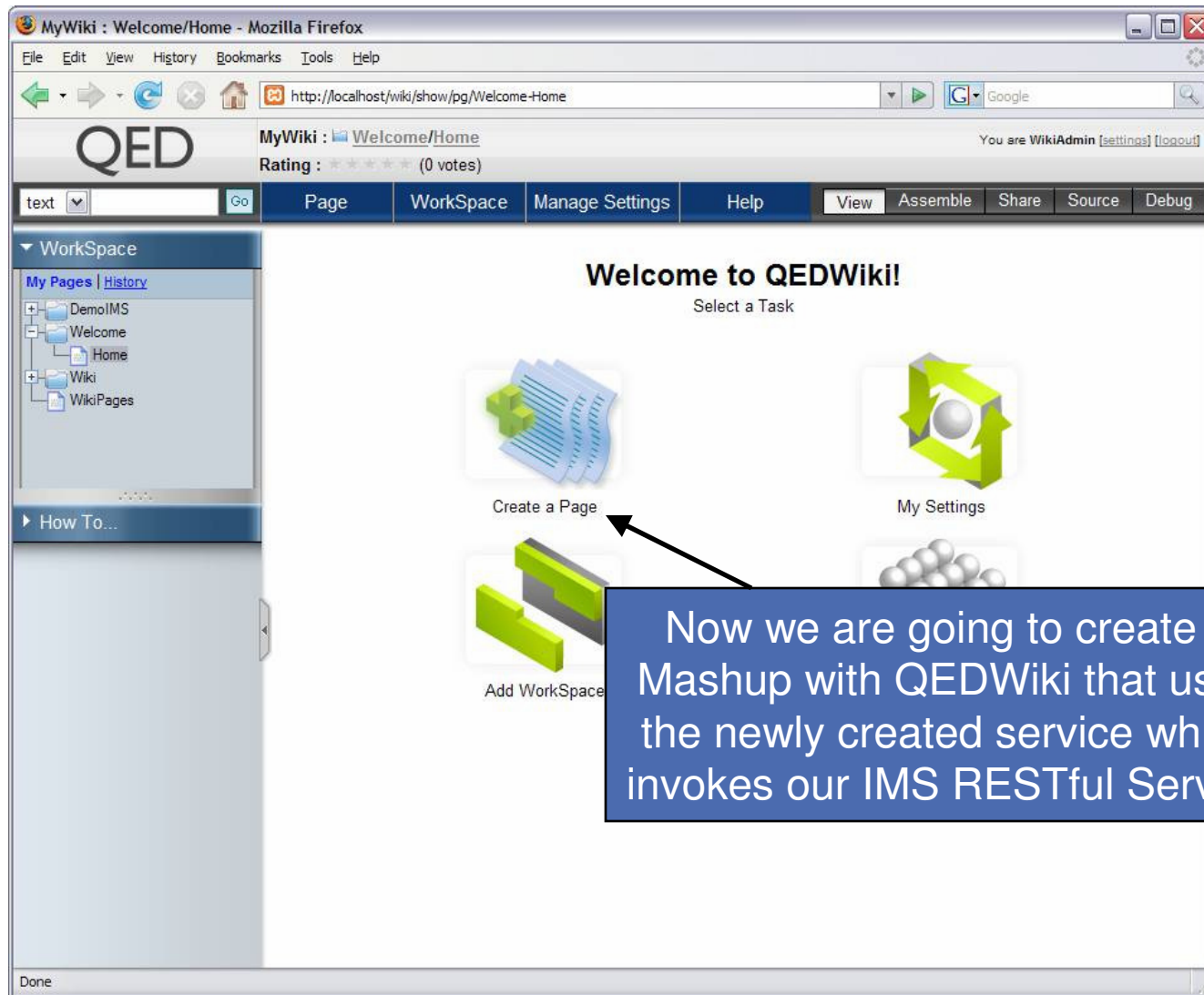
Use the **Save** button to create a new service

The newly created service will take a zip code as input and provide the following information on all National Tractor Co. Dealer locations within 100 miles of that zip code

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Done cloudred.usca.ibm.com:8443

QEDWiki – Creating a Web Mashup



QEDWiki – Creating a Web Mashup (cont)

The screenshot shows the QEDWiki interface in Mozilla Firefox. The main content area is titled "Editing Xml Grabber" and contains the following fields:

- Widget Name:** xml
- URL:** http://localhost/TOM/client/plugin/generate/pluginid/13/entryid/69

A blue callout box with white text points to the "XmlGrabber" widget in the "Widgets" list on the left. The text in the callout box reads: "Use the **XmlGrabber** Widget to access our newly created service (which invokes the **IMS RESTful Service**) through its URL".

QEDWiki – Creating a Web Mashup (cont)

Use the **XmlViewer** Widget to selectively display information retrieved through the **XmlGrabber** Widget

| Company | Address | Phone |
|--|---|----------------|
| TRACTOR MEDIC CO. | 523 Moraga W Orinda CA 94563 | (925) 631-0711 |
| TRACTOR EQUIPMENT CO. | 19997 Shadow Creek Cir Castro Valley CA 94552 | (510) 583-5092 |
| MIDSIZE TRACTORS | 18880 Homestead Rd Cupertino CA 95014 | (408) 863-9900 |
| TRACTORS RANCH CO. | 5600 Cottle Rd San Jose, CA 95193 | (408) 256-1600 |
| THE TRACTOR CO OF NOR CAL TRUCKS AND | 650 Harry Road San Jose CA 95120 | (408) 927-1080 |

Widget Documentation

Widgets in Use

- xml-Xml Grabber
- list-Show Data
- echo-Echo
- echo1-Echo
- echo2-Echo
- echo3-Echo

QEDWiki – Creating a Web Mashup (cont)

Use the GoogleMap Widget to display the dealers' locations on the map

| | Address | Phone |
|--|--|----------------|
| | 4100 Bohannon Dr Menlo Park CA 94025 | (650) 926-6300 |
| | 50 California St # 1500 an Francisco CA 94111 | (415) 439-5255 |
| | 523 Moraga Way San Jose, CA 95193 | (408) 236-1000 |
| | 650 Harry Road San Jose CA 95120 | (408) 927-1080 |

Widget Documentation

Widgets in Use

- xml-Xml Grabber
- list-Show Data
- g468-GoogleMap
- echo-Echo
- echo1-Echo
- echo2-Echo

National Tractor Co. Web Mashup leveraging IMS Assets

MyWiki : DemoIMS/NationalTractorCo - Mozilla Firefox

http://localhost/wiki/show/pg/DemoIMS-NationalTractorCo/_standalone/tv/_content

NT_RC National Tractor Company 2.0

LS450 Lawn Tractor

The following stores have this item in stock. Select a store below to see more information.

| Name | Address | Phone |
|--------------------------------------|---|----------------|
| INDUSTRIAL EQUIPMENT LAWN N GARDEN | 4100 Bohannon Dr Menlo Park CA 94025 | (650) 926-6300 |
| TRACTOR MEDIC CO. | 50 California St # 1500 an Francisco CA 94111 | (415) 439-5255 |
| TRACTOR MEDIC CO. | 523 Moraga Way Orinda CA 94563 | (925) 631-0711 |
| TRACTOR EQUIPMENT CO. | 19997 Shadow Creek Cir Castro Valley CA 94552 | (510) 583-5092 |
| MIDSIZE TRACTORS | 18880 Homestead Rd Cupertino CA 95014 | (408) 863-9900 |
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