



Session: A21

Modernizing and Integrating Green Screen (3270) Applications in
SOA using WebSphere HATS

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IBM
SYSTEM z9 AND zSERIES EXPO
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Topics

Background and Introduction

HATS overview: Features and
Functions

Programmatic Integration: SOA and
Web Services

What's new in HATS v6 and 6.0.x

Case Study: Amica Insurance

Summary

The Reality of Existing Applications

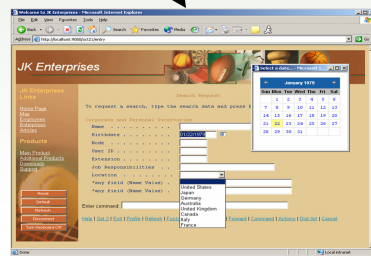
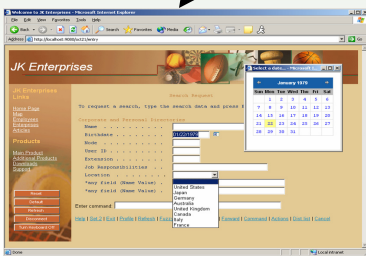
- **200 billion lines of COBOL code exist today**
 - *5 billion lines are added each year*
 - *Similar inventory of RPG and PL/I code*
- **The typical mainframe customer has:**
 - *30M lines of COBOL code*
 - *Worth \$600M*
 - *Automating 100,000 business processes*
- **Banking, Insurance, Government, Manufacturing, Travel and Transportation, Distribution and Retail, Media and Utilities, Healthcare Industries**

Consultants estimate it costs 5 times more to rewrite a business function than to reuse existing code

Challenges and Customer Requirements

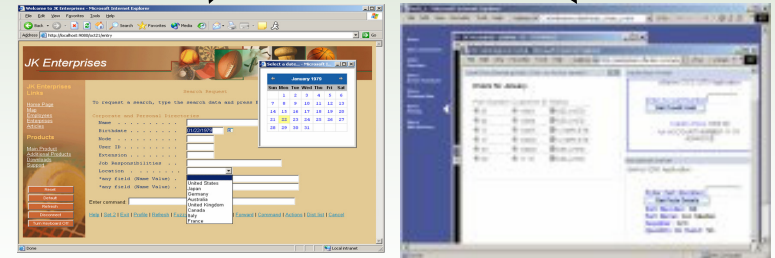


- **Customers want to improve the appearance of user interfaces to existing applications**
 - **Reduce learning curve for newer employees**
 - **Extend existing applications to new units and departments and to new business partners and end-user customers**
- **Customers want to improve employee productivity by streamlining application flow**
 - **Automate where appropriate - eliminate unnecessary keystrokes and screen navigations**
 - **Customize access to existing applications for specific set of users**



Challenges and Customer Requirements

- **Customers want to eliminate / reduce administration and maintenance of installed client software to access existing applications**
 - **IBM or 3rd party 3270 or 5250 emulation client SW packages**
 - **Make existing applications accessible from anywhere - independent of client HW/SW platform**
- **Customers want to build unified composite applications that better suit their current business processes**
 - **Combine business logic and data contained in multiple existing applications to a unified application**



Customers want to do all this while minimizing changes, leveraging reliability, stability and dependability of existing applications and infrastructures.

What is Host Access Transformation Services?

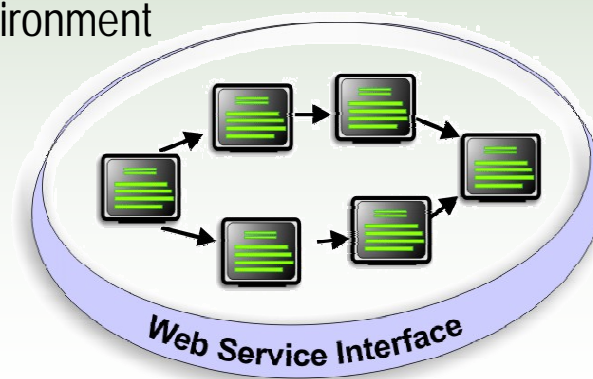
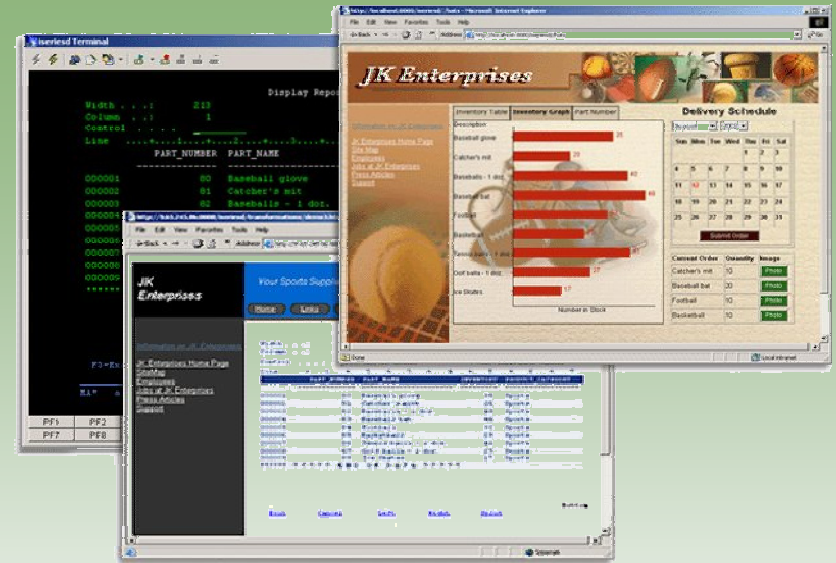
Automatically transforms 3270 & 5250 green screen applications into HTML interfaces

Extends terminal applications as Web Services

Low skills requirement

Rules-based, highly customizable

Iterative, eclipse-based development environment

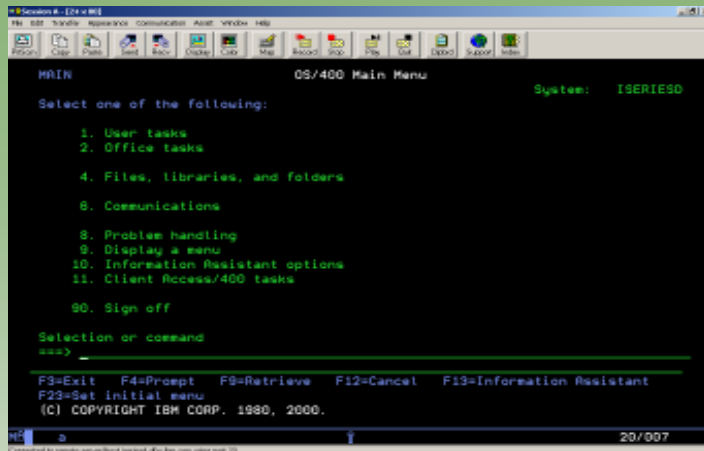


WebSphere software

Host Access Transformation Services

- Zero footprint
- Non-invasive
- No software download to client machine

Modernize and streamline “green screen” applications



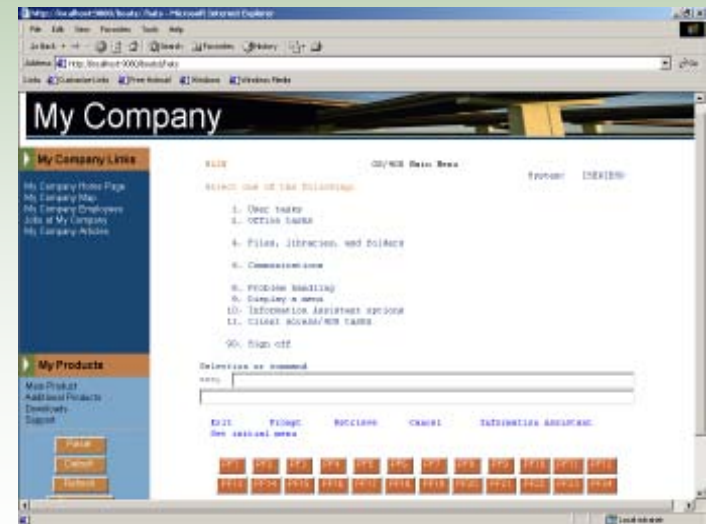
3270 or 5250
Data stream



Combine data from multiple screens, applications and databases

Build self-service transactions

Build Web Services

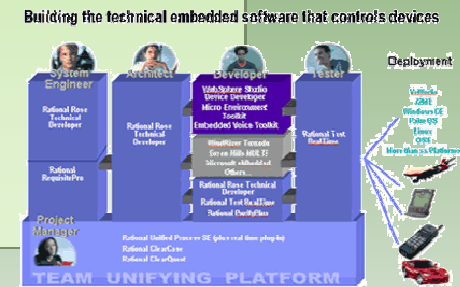


Screen transformation rules running on
WebSphere Application Server

WebSphere Based Architecture

IBM Rational Software Development Platform Tool

HATS Toolkit is an Eclipse plug-in to the IBM Rational Software Development Platform Tool
 Wizard-based
 Creates HATS applications



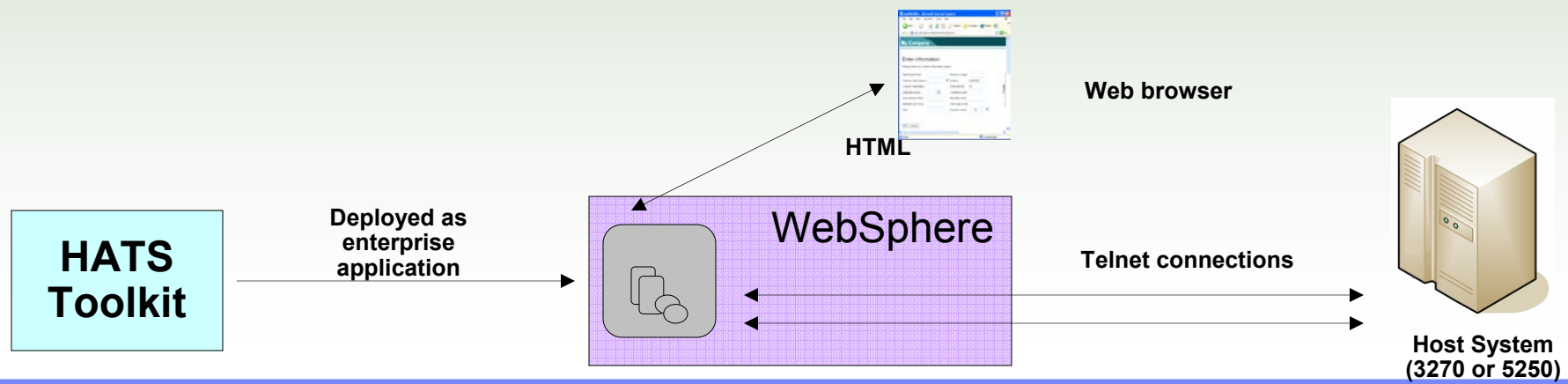
WebSphere Application Server and WebSphere Portal Server

HATS leverages WebSphere Application Server (WAS) or WebSphere Portal Server at runtime
 HATS Toolkit creates J2EE .war and .ear files for deployment
 HATS runtime is contained in the HATS application



HATS Tasks

- Using the HATS Toolkit, developers build J2EE Web applications.
- HATS/WebSphere administrator deploys the applications to WebSphere Application Server or WebSphere Portal Server.
- Using a Web browser, users access these applications with a URL.
- HATS, using the rules defined by the developer, transforms the screens into HTML, fills in data on the user's behalf, or automates navigation through the application.
- HATS/WebSphere administrator monitors the HATS application



Improve Navigation & Productivity

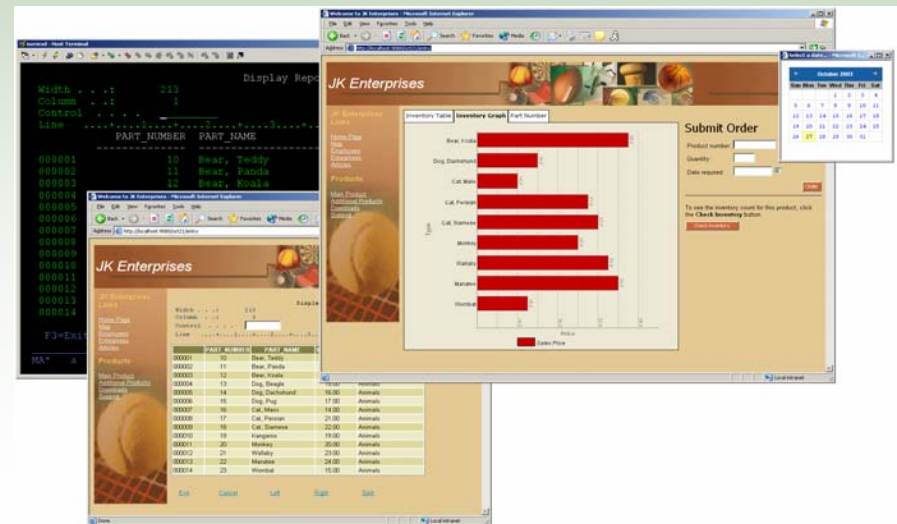
- Macros & Global Variables
 - Skip unnecessary screens; combine screens; split screens, enter data on behalf of the end user
 - Store end user input as global variables; prefill text entry fields
- Help Improve User Interface with Screen Customization
 - Drag and drop HATS components from the palette onto your Web page
 - Add buttons, hot links, drop-down menus, valid value lists,
 - Modify graphics, fonts, colors, and layout
- Add business logic
- Local print support
- Native keyboard support
- Security – HTTPs, SSL
- Supports iterative development
 - Fully functional HATS application on the web quickly
 - Use Default Transformation Rules
 - Customize Transformation rules iteratively



Increase Productivity – Reduce Training Costs

- **Increases productivity and reduces training costs as it extends host applications to the widest possible audience...**
 - *by delivering HTML to Web browsers,*
 - *improving work flow from multiple applications,*
 - *and presenting host screens as familiar Web pages.*

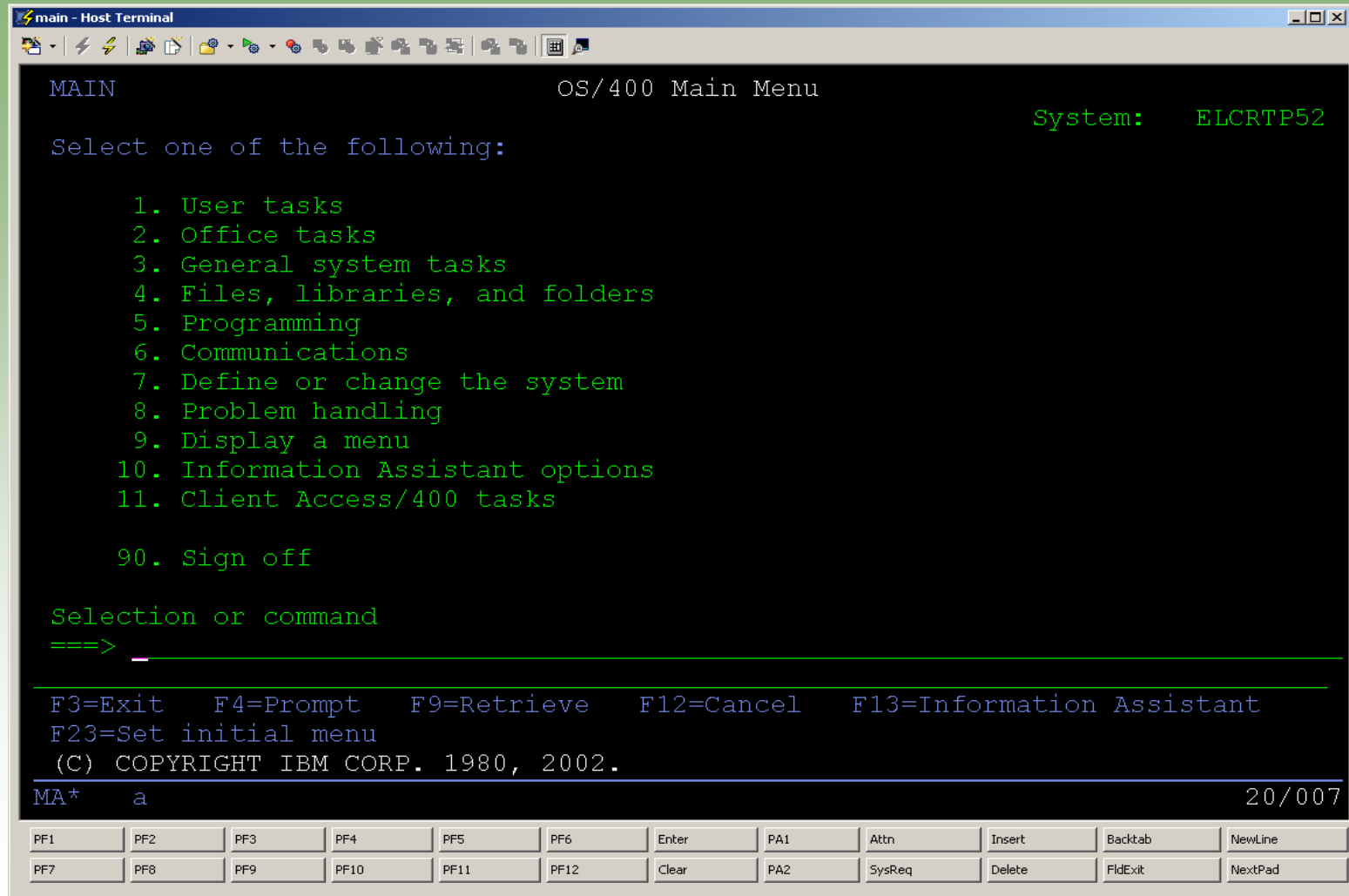
- **Build applications that look and behave like the original green screen application OR build applications that dramatically enhance the application!**



Recent Customer Example

- **Green Screen navigation:**
 - *24 screens*
 - *98 key strokes*
- **After HATS Customization:**
 - *10 HTML pages*
 - *41 key strokes*

Traditional Green Screen



The image shows a screenshot of a green screen terminal window titled "main - Host Terminal". The screen displays the "OS/400 Main Menu" with the system name "ELCRTP52". The menu lists 11 options for selection, followed by a "Selection or command" prompt with a cursor. Below the menu, there are function key definitions: F3=Exit, F4=Prompt, F9=Retrieve, F12=Cancel, F13=Information Assistant, and F23=Set initial menu. The copyright notice "(C) COPYRIGHT IBM CORP. 1980, 2002." is visible. At the bottom of the screen, the prompt "MA* a" and the date "20/007" are shown. A keyboard layout is visible at the very bottom of the terminal window, including PF1 through PF12, Enter, Clear, PA1, PA2, Attn, SysReq, Insert, Delete, Backtab, FldExit, NewLine, and NextPad.

```
main - Host Terminal
MAIN                               OS/400 Main Menu
                                     System:  ELCRTP52

Select one of the following:

  1. User tasks
  2. Office tasks
  3. General system tasks
  4. Files, libraries, and folders
  5. Programming
  6. Communications
  7. Define or change the system
  8. Problem handling
  9. Display a menu
 10. Information Assistant options
 11. Client Access/400 tasks

 90. Sign off

Selection or command
===> _____

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F23=Set initial menu
(C) COPYRIGHT IBM CORP. 1980, 2002.

MA* a                                     20/007

PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Attn Insert Backtab NewLine
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete FldExit NextPad
```

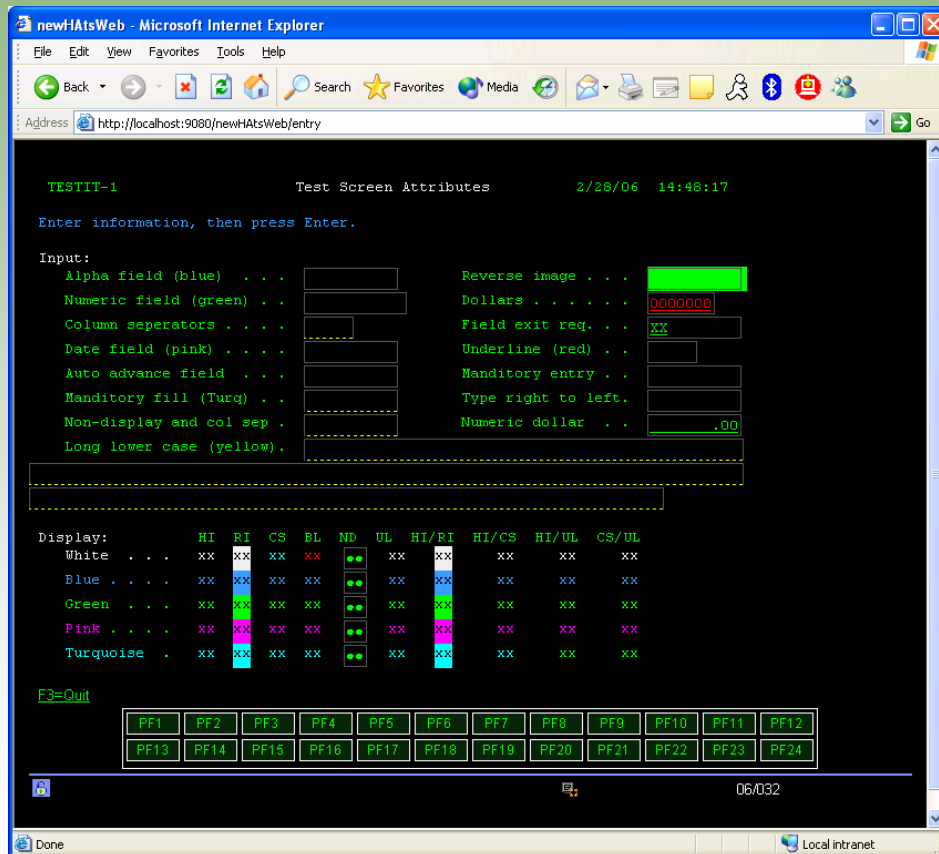
Transformation Using Default Rules



HATS Minor Modifications



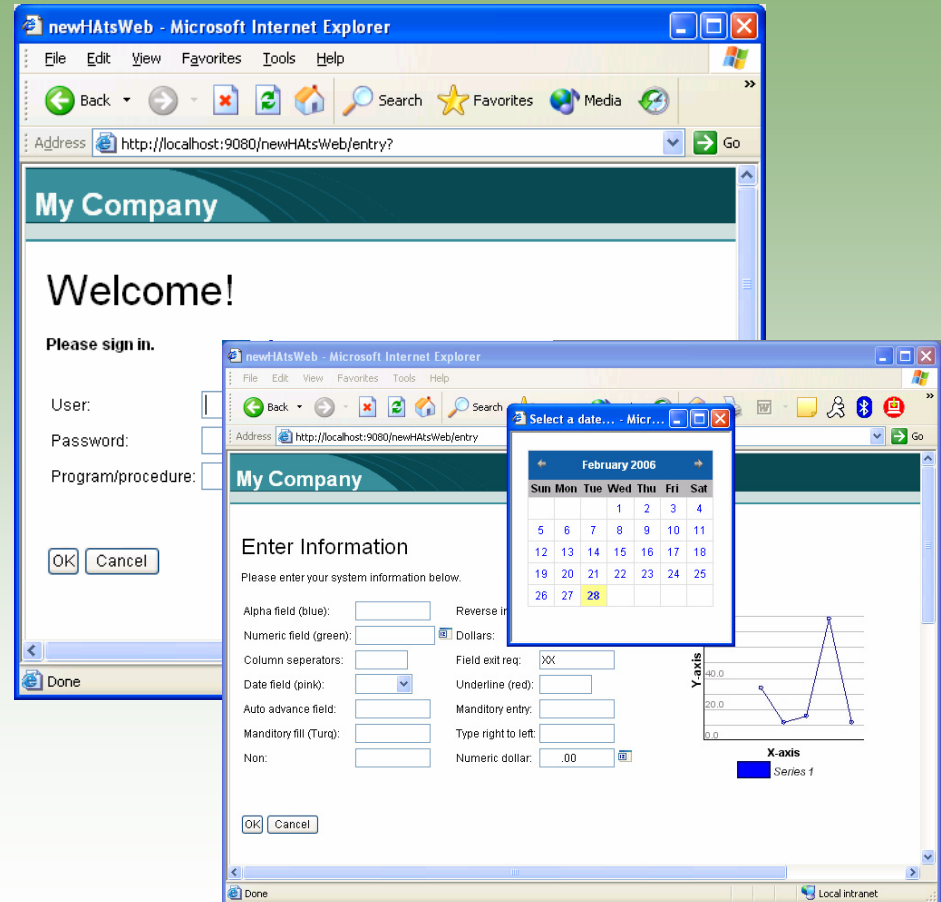
Achieving a Green Screen Look with HATS



- HATS supports host colors and extended field attributes, including:
 - *Numeric only, alphabetic only, signed numeric, reverse image, column separator, underline, and blink fields*
- Supports automatic field advance
- Field exit, plus, minus support (5250 only)
 - *Improvements have been made in HATS 6.0.3 and 6.0.4*
- Host keypad and OIA can be displayed (and positioned anywhere)
- Native keyboard support (i.e. pressing F12 in the browser sends F12 to the host application).

Achieving a Modern Web Look with HATS

- Individual screens can be customized with a rich set of user controls, including:
 - Popup lists, drop-downs, checkboxes, lists, radio buttons, calendar popups, graphs, etc.*
- Information from the host screen can be suppressed on the Web page and a screen can be split up over multiple Web pages.
- Functions / actions can be restricted.
- Information can be displayed and organized in tabs.
- One customized Web page can be applied to more than 1 host screen!



Combining Screens

The screenshot shows a Microsoft Internet Explorer browser window displaying the 'JK Enterprises' website. The page title is 'JK Enterprises' and the main content area shows 'Search Results' with 32 records found. The search results are displayed in a table with columns for ID, Part, Name, Price, and Category. The table lists various animals and their prices, such as 'Bear, Teddy' for 26.00 and 'Jaguar' for 17.00. The browser's address bar shows 'Welcome to JK Enterprises - Microsoft Internet Explorer'. In the foreground, three overlapping 'iseriesd - Host Terminal' windows are visible. The top terminal window displays 'Display Report' and a list of numbers from 000001 to 000014. The middle terminal window displays a similar list of numbers from 000015 to 000028. The bottom terminal window displays a list of numbers from 000029 to 000032, followed by a line of asterisks and the text 'PART_NU'. The terminal windows also show keyboard shortcuts like 'F3=Exit' and 'MA* a'.

ID	Part	Name	Price	Category
000001	10	Bear, Teddy	26.00	Animals
000002	11	Bear, Panda	26.00	Animals
000003	12	Bear, Koala	25.00	Animals
000004	13	Dog, Beagle	15.00	Animals
000005	14	Dog, Dachshund	16.00	Animals
000006	15	Dog, Pug	17.00	Animals
000007	16	Cat, Manx	14.00	Animals
000008	17	Cat, Persian	21.00	Animals
000009	18	Cat, Siamese	22.00	Animals
000010	19	Kangaroo	19.00	Animals
000011	20	Monkey	20.00	Animals
000012	21	Wallaby	23.00	Animals
000013	22	Manatee	24.00	Animals
000014	23	Wombat	15.00	Animals
000015	24	Bird, Cockatoo	19.00	Animals
000016	25	Bird, Macaw	18.00	Animals
000017	26	Chinchilla	19.00	Animals
000018	27	Ferret	20.00	Animals
000019	28	Hamster	17.00	Animals
000020	29	Rabbit	23.00	Animals
000021	30	Alligator	21.00	Animals
000022	31	Crocodile	22.00	Animals
000023	32	Dinosaur	20.00	Animals
000024	33	Frog	12.00	Animals
000025	34	Bobcat	18.00	Animals
000026	35	Mountain Lion	19.00	Animals
000027	36	Jaguar	17.00	Animals

HATS Customized Transformation

JK Enterprises

JK Enterprises Links
[Home Page](#)
[Map](#)
[Employees](#)
[Enterprises](#)
[Articles](#)

Products
[Main Product](#)
[Additional Products](#)
[Downloads](#)
[Support](#)

Reset
 Default
 Refresh
 Disconnect
 Turn Keyboard Off

Inventory Table | **Inventory Graph** | Part Number

Type	Price
Bear, Koala	25.0
Dog, Dachshund	10.0
Cat, Manx	14.0
Cat, Persian	21.0
Cat, Siamese	22.0
Monkey	20.0
Wallaby	23.0
Manatee	24.0
Wombat	15.0

Submit Order

Product number:

Quantity:

Date required:

To see the inventory count for this product, click the **Check Inventory** button.

Select a date... - Microsoft I...
 October 2003
 Sun Mon Tue Wed Thu Fri Sat
 5 6 7 8 9 10 11
 12 13 14 15 16 17 18
 19 20 21 22 23 24 25
 26 27 28 29 30 31

Global Rules and Valid Value Lists

JK Enterprises

JK Enterprises Links

- [Home Page](#)
- [Map](#)
- [Employees](#)
- [Enterprises](#)
- [Articles](#)

Products

- [Main Product](#)
- [Additional Products](#)
- [Downloads](#)
- [Support](#)

Reset
Default
Refresh
Disconnect
Turn Keyboard Off

Search Request

To request a search, type the search data and press E

Corporate and Personal Directories

Name

Birthdate 01/22/1979

Node

User ID

Extension

Job Responsibilities

Location

*any field (Name Value)

*any field (Name Value)

Enter command: _____

[Help](#) | [Set 2](#) | [Exit](#) | [Profile](#) | [Refresh](#) | [Fuzzy](#) | [Forward](#) | [Command](#) | [Actions](#) | [Dist list](#) | [Cancel](#)

Select a date... - Microsoft I...

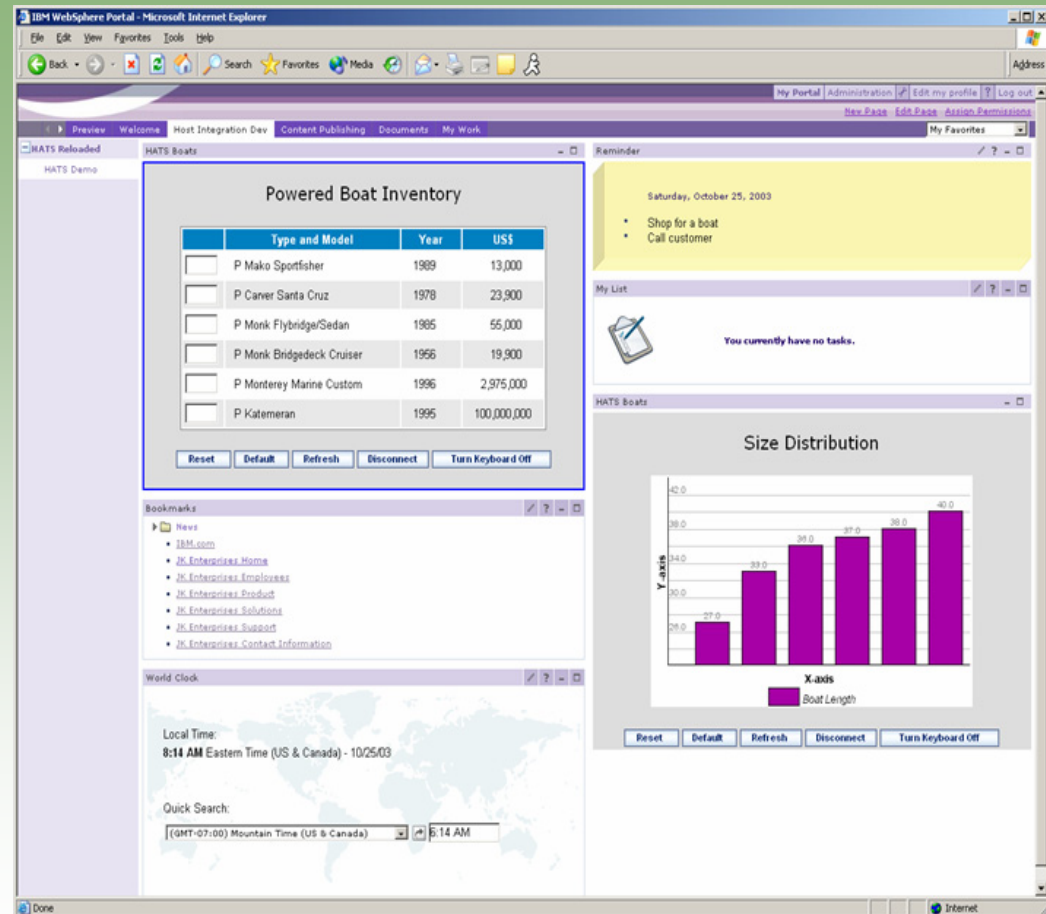
January 1979

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Done Local intranet

Integration with WebSphere Portal

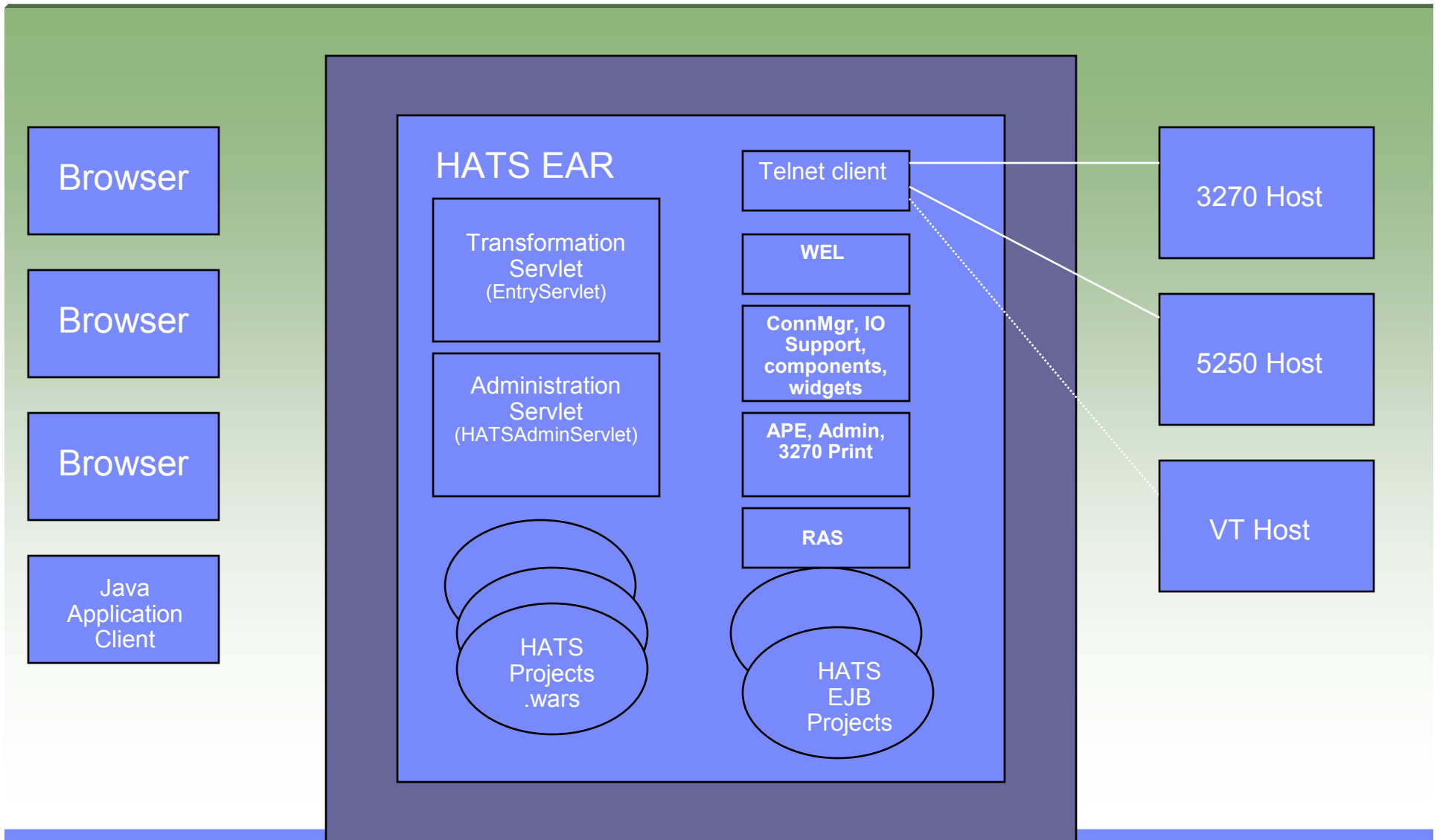
- Automatically generates portlets for use with WebSphere Portal
- HATS supports:
 - Click-to-Action
 - Cooperative Portlets
 - Credential Vault
 - Single Sign-On
- HATS is ideal for use with portals because screens can be customized to reduce the amount of data displayed
- Multiple HATS portlets can be added to the same page.



HATS Single Sign-On Support

- HATS supports Single Sign-On, which allows users to logon to multiple host systems while presenting credentials only once
- Increased Productivity
 - Credentials requested only once
 - No need to administer and maintain multiple logon identities
 - Reduced password-related support calls
- Secure
 - Works in conjunction with existing network security applications, such as Tivoli Access Manager or Portal Security
 - Retrieves network security credentials and maps to host credentials

HATS Application



Typical Questions

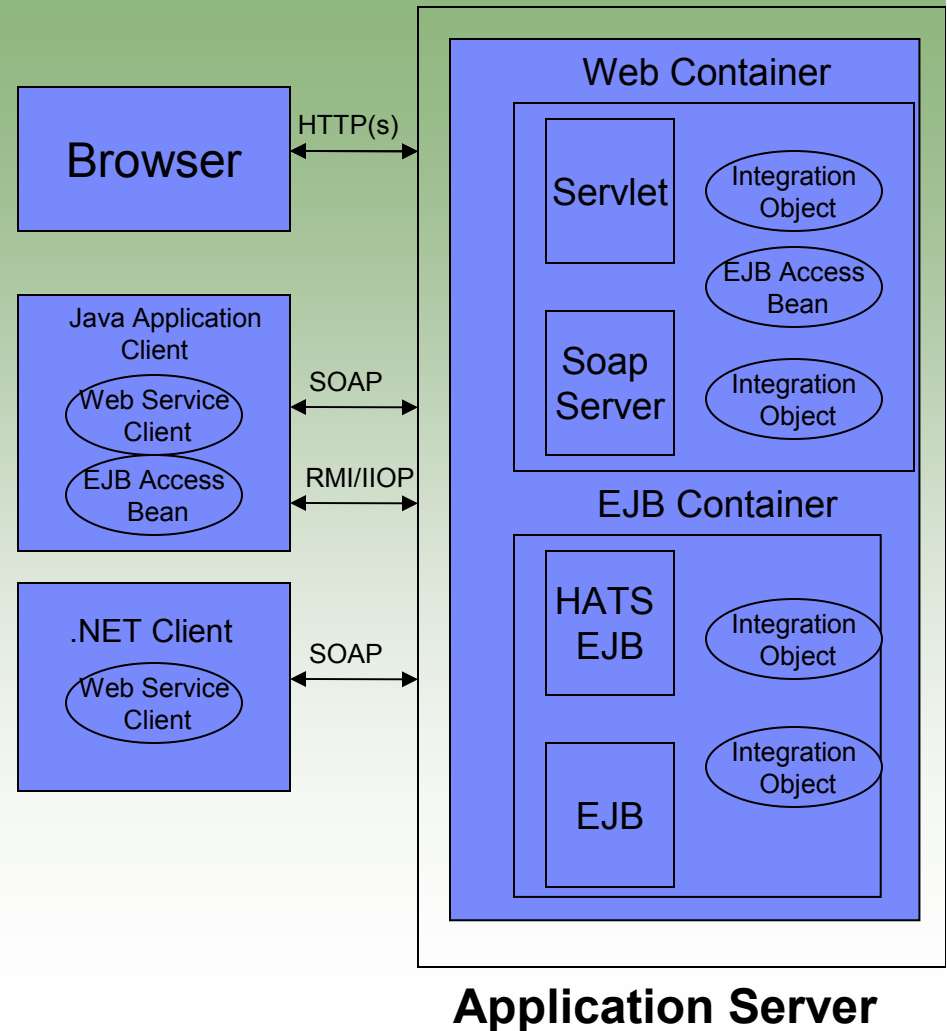


1. Question: How much time does it take to get a HATS application up and running? Answer: Only minutes to create and deploy an application that will transform ALL greens screen on-the-fly.
2. Question: What happens if I change my green screen application? Answer: If using default rendering, HATS picks up the change automatically and transforms the screen. In other scenarios, depending on the type of change and how the application was customized, further modifications may need to be made to the HATS application.
3. Question: Do I need to import DDS or BMS maps? Answer: No
4. Question: Do I have to customize every screen? Answer: No, only customize the screens / sets of screens needed – default rendering handles the rest.
5. Question: What skills are required to develop with HATS? Answer: Basic IDE skills, unless you need to do advanced integration. HTML skills are recommended for doing more advanced Web development.

Programmatic Integration: SOA and Web Services

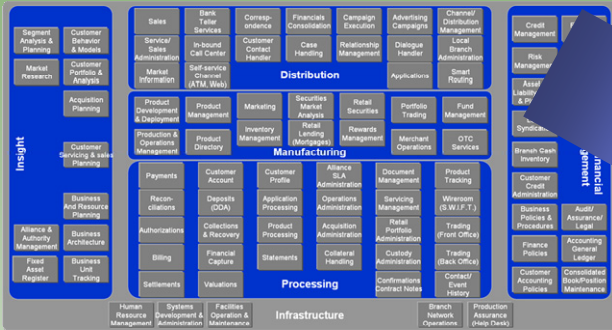
Application to Application Integration

- Integrate terminal applications with J2EE applications
- Create reusable components:
 - Encapsulate screen navigations (macros) that define a terminal application business process in a standard JavaBean
 - HATS Integration Object (IO)
 - Supports session priming and pooling
 - “Chain” IOs for interactive flow through terminal application
- Using HATS toolkit:
 - “Wrap” one or more IOs in a Web service
 - Create HATS EJB projects and EJB Access Beans (EJB client)
- Using Rational Software Development Platform, use IO(s) in:
 - Web services
 - EJBs
 - Servlets
- Access IO remotely via .NET or Java Application client

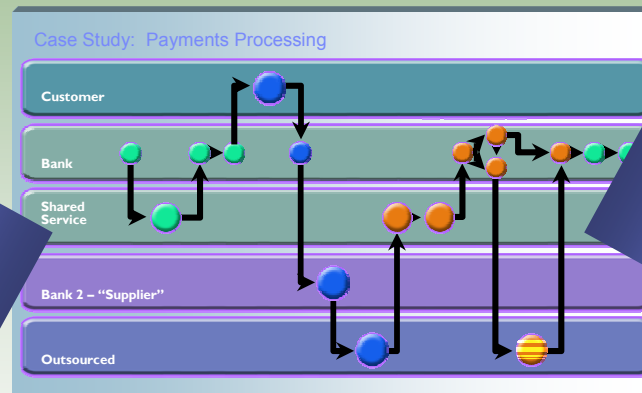


Flexible business requires flexible IT - SOA

Full Business view

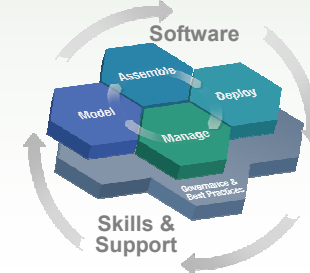


Process to optimize



Creating IT flexibility

IBM SOA Foundation



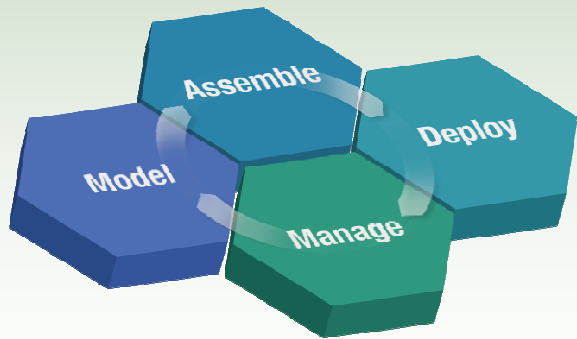
Service Oriented Architecture (SOA) Definitions

What is a service?

A **repeatable business task**
– e.g., check customer credit; open new account

What is a Service Oriented Architecture (SOA)

An IT **architectural style** that supports integrating your business as linked services



- Model your business processes
- Build or re-use existing assets into business-level, loosely-couple IT components based on open standards
- Assemble your IT services
- Deploy, monitor, and manage your system

How HATS Fits into the SOA World

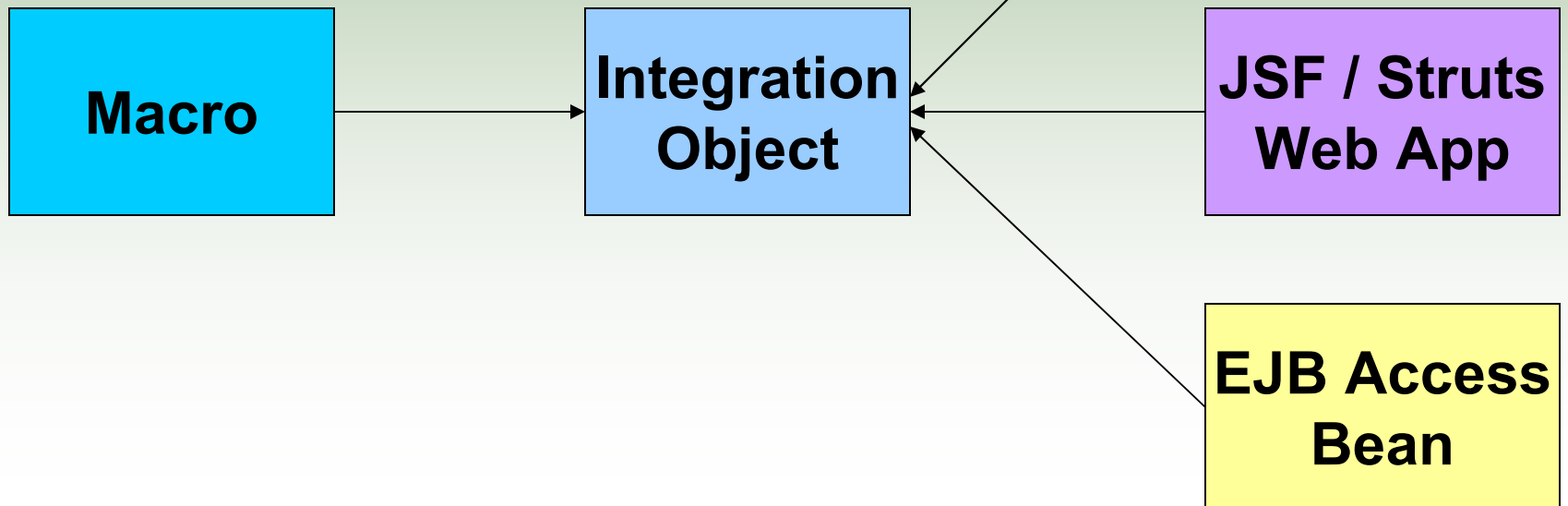
- **HATS provides the tools to develop industry standard Web services that can drive existing terminal applications.**
 - *Existing processes can be broken down and exposed as reusable components in a larger SOA environment.*

- **The process for building Web services using HATS is straightforward:**
 - *Identify the process to expose*
 - *Identify the flow of screens*
 - *Identify the required inputs*
 - *Identify the required outputs*

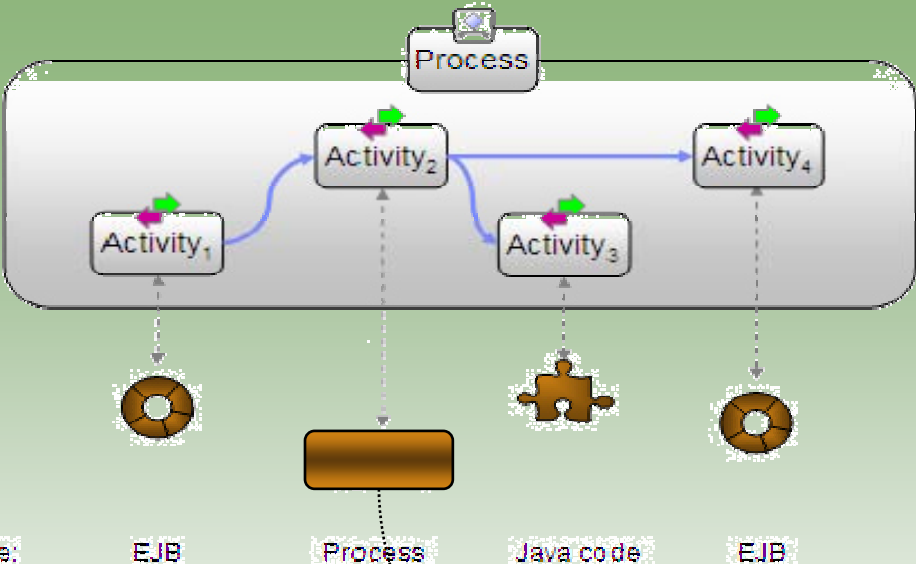
- **HATS does not require modification to your existing applications.**

Concepts

1. A macro is a script that drives navigation through a set of host screens.
2. An Integration Object (or IO) is a Java bean that wrappers a macro.
3. Web Services, JSF / Struts Web applications, and EJB Access Beans all drive Integration Objects.

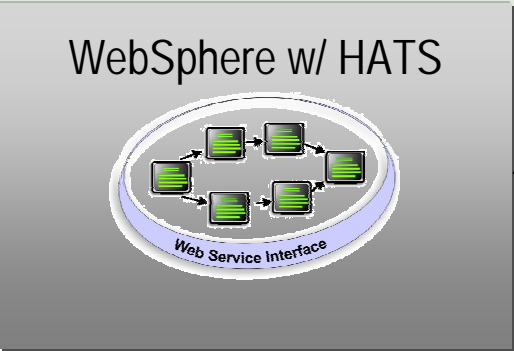


Integration w/ WebSphere Process Server

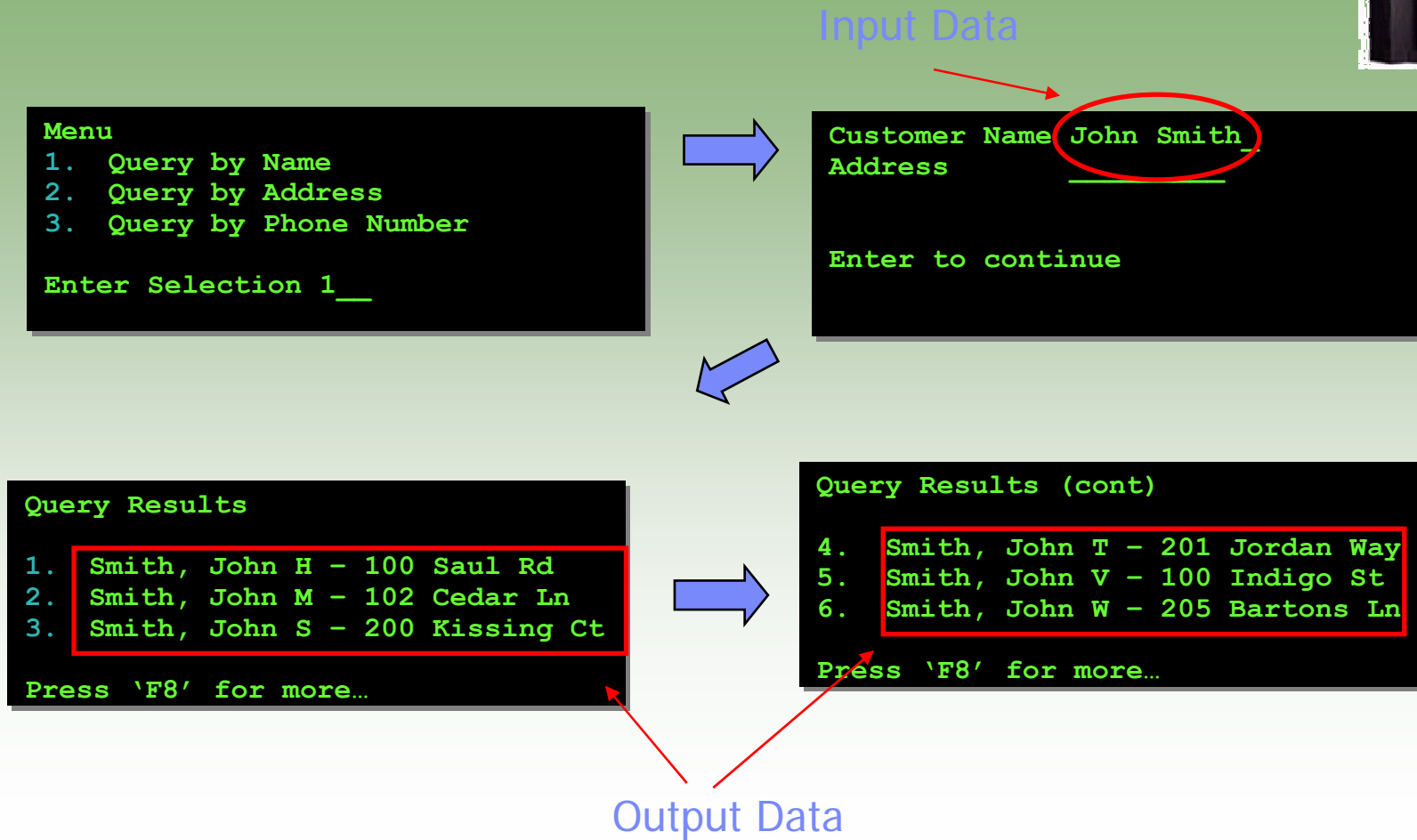
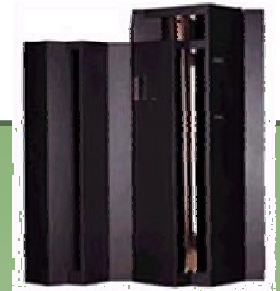


HATS is an IBM WebSphere offering for exposing terminal-based mainframe applications for reuse in a BPEL process.

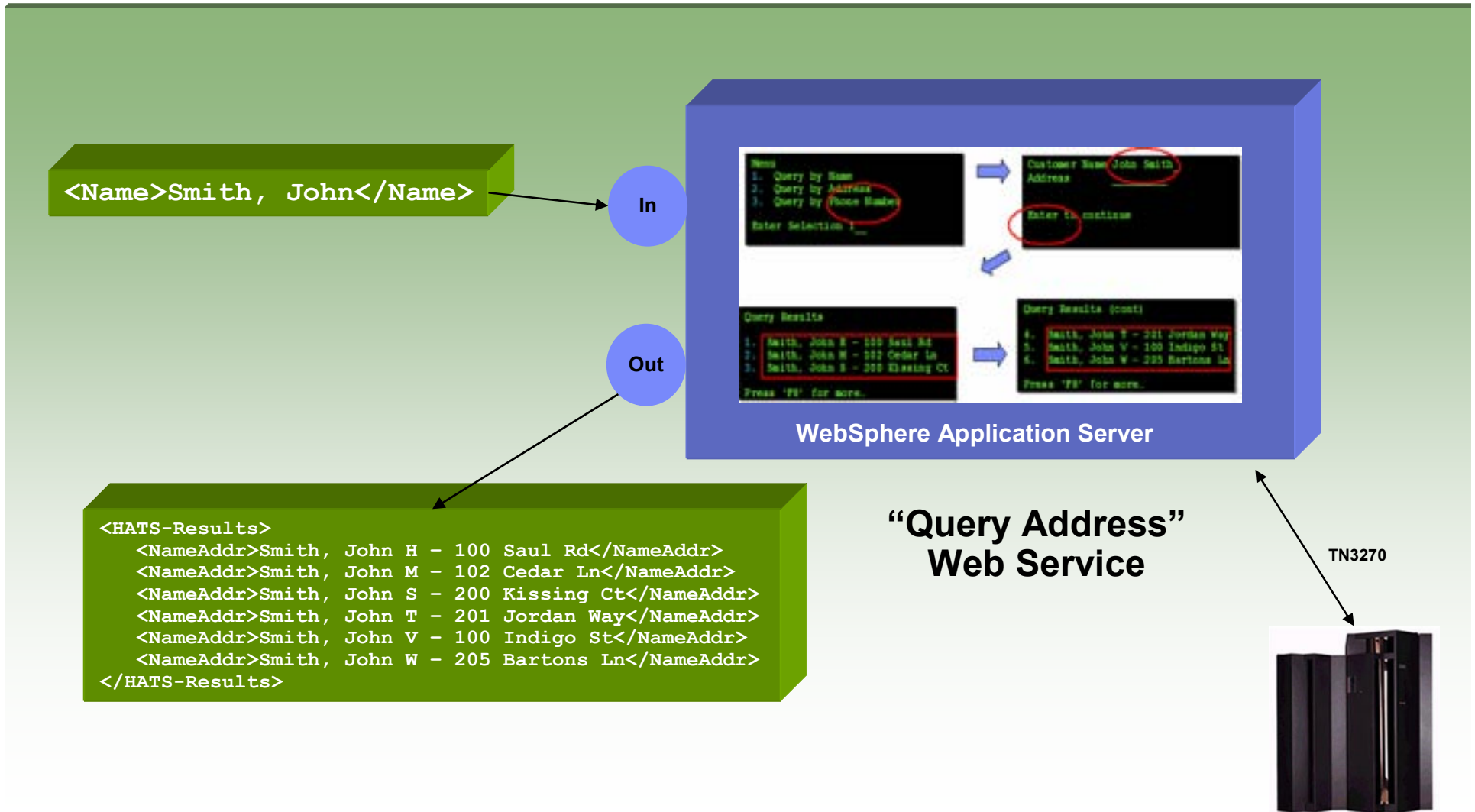
Up to 80% of all mainframe applications are terminal-based.



How It Works - A simple example



How It Works - A simple example (cont.)



What's New in HATS V6?

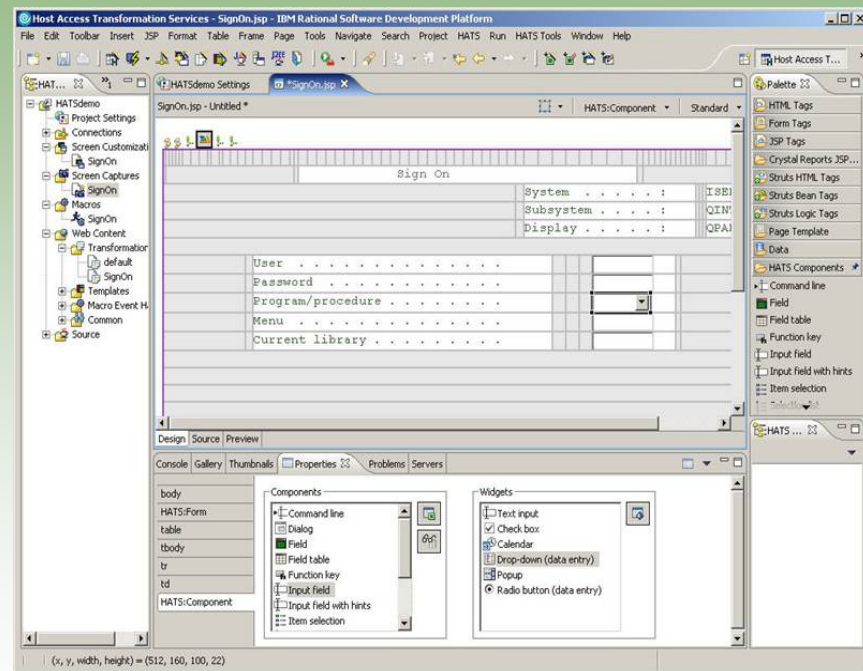
Goals for HATS 6.0

- **Improve developer ease-of-use.**
 - *Improve speed and ease of screen customization.*
 - *Provide debug tools to enhance macro development experience*

- **Maintain currency with other WebSphere software**
 - *WebSphere Application Server v5.1.x, v6.0.x*
 - *WebSphere Portal Server v5.0, v5.0.2.x*

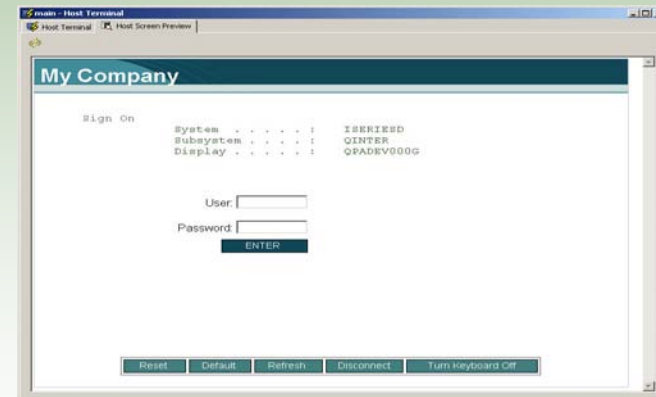
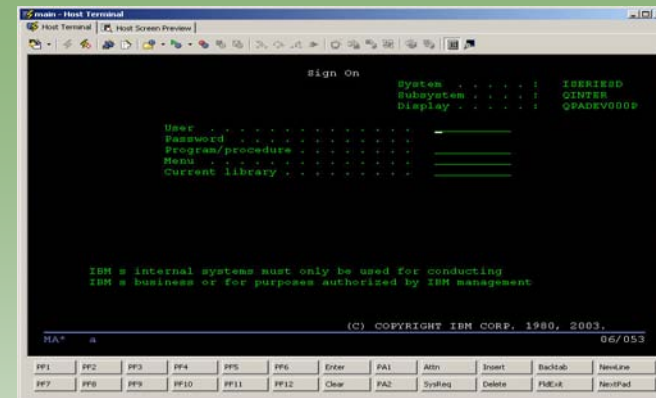
Transformation Creation and Editing Improvements

- HATS Components available in the Palette view
- Pre-fill transformations with default rendering
- Free layout mode in Page Designer
- Use of Properties View for modification of components, widgets and text replacement
- Apply style sheets in Design view

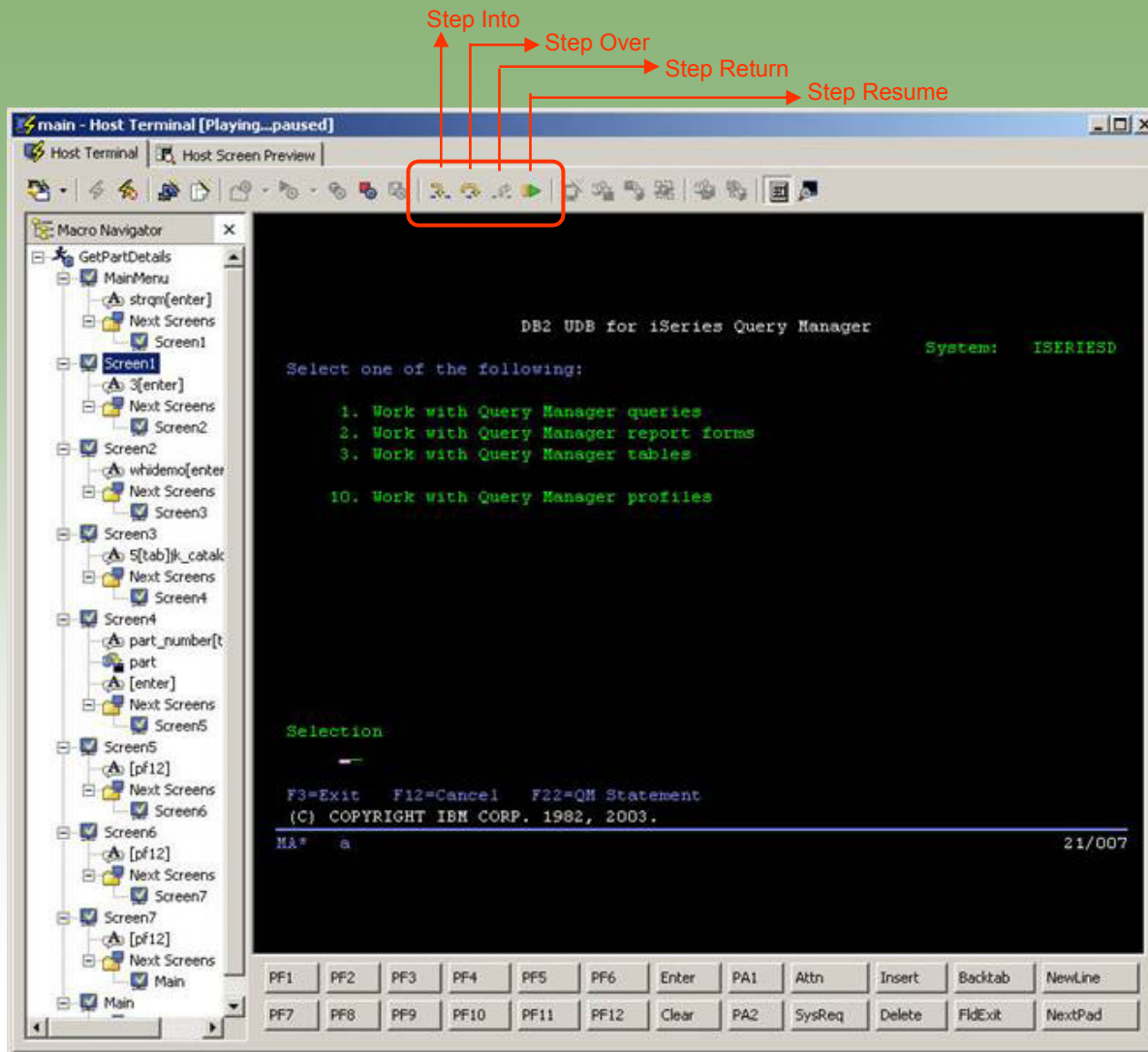


Host Terminal Preview

- Provides screen previewing from within the Host Terminal. This enables a developer to quickly see how a particular screen will be transformed when running on the server.
- Screen recognition is performed (using the screen customizations defined in the project) and the associated transformation is applied.
- Preview area is read-only (cannot navigate the host terminal).



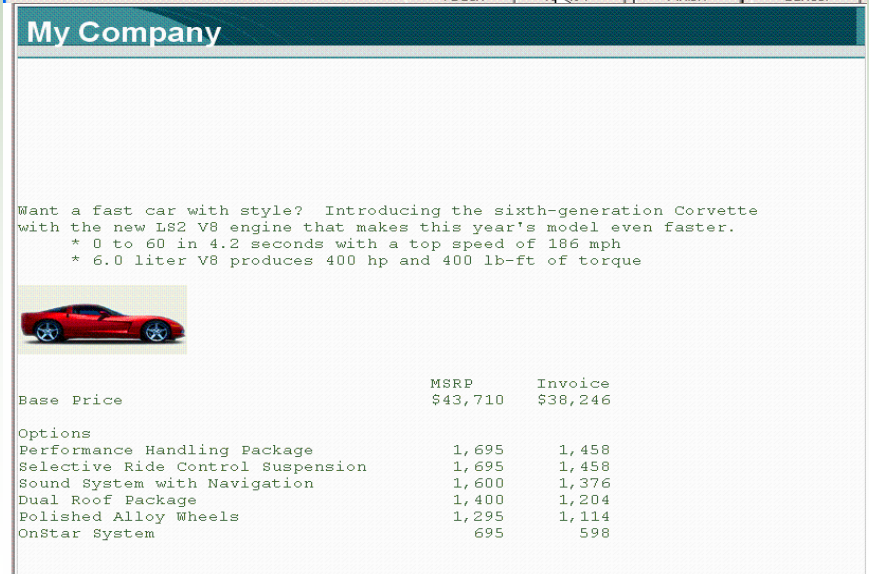
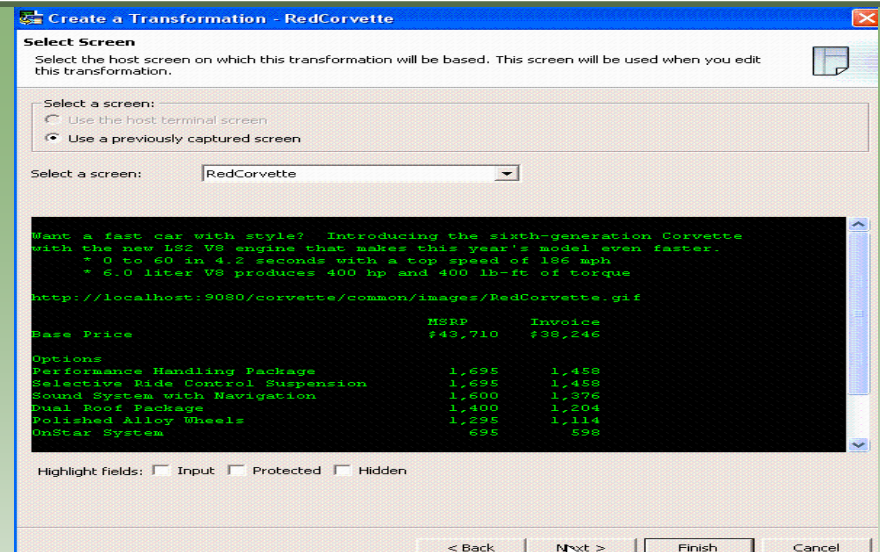
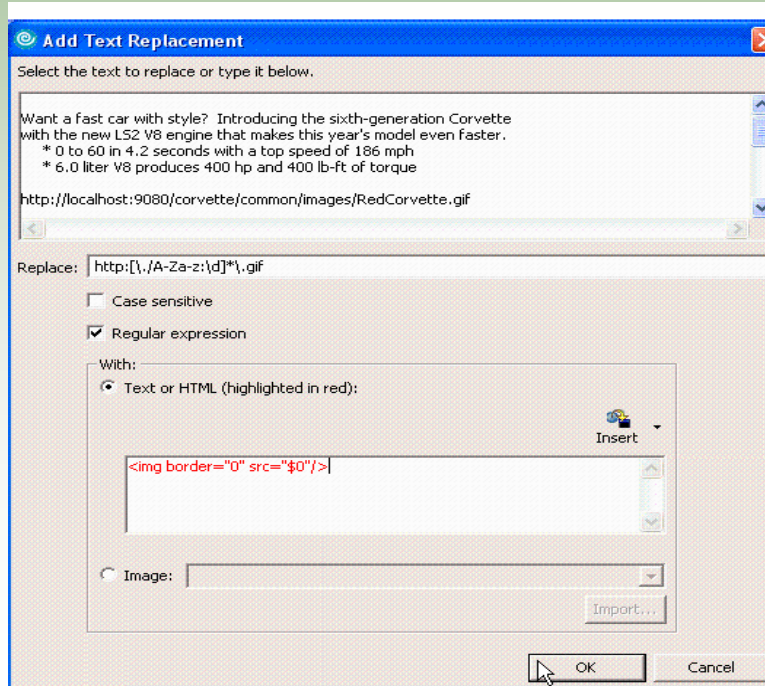
Macro Stepping



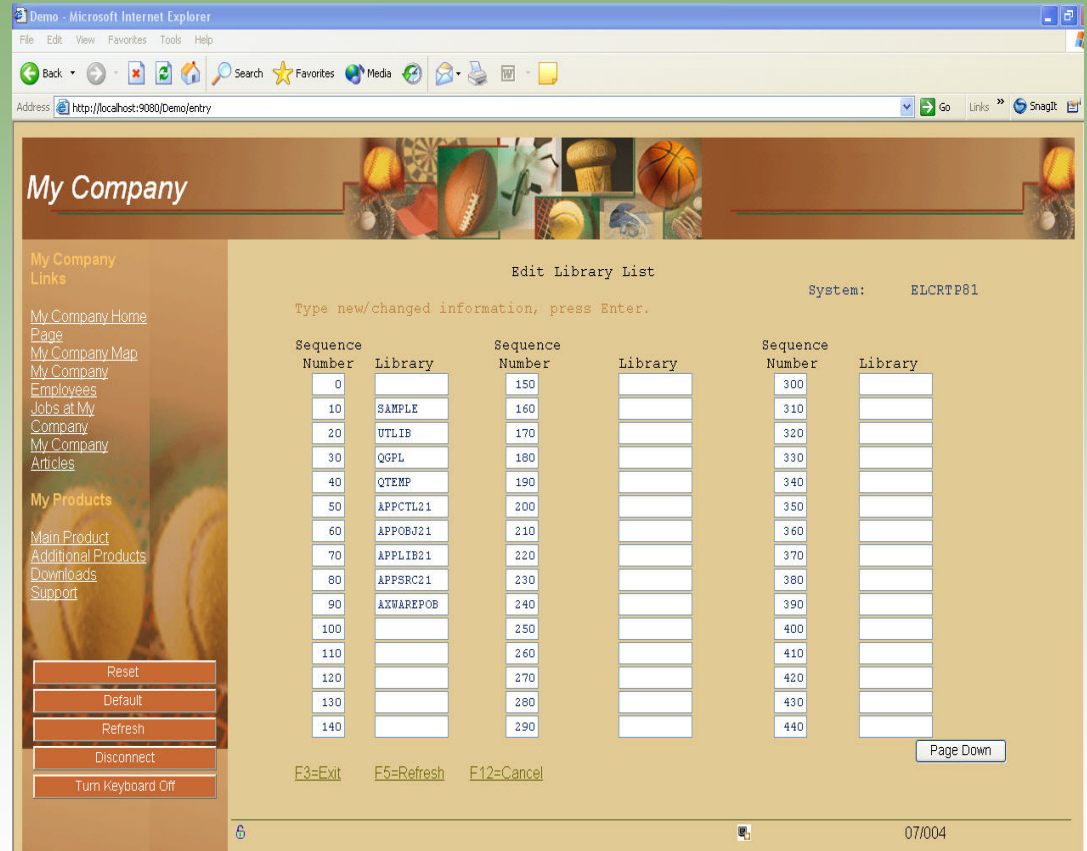
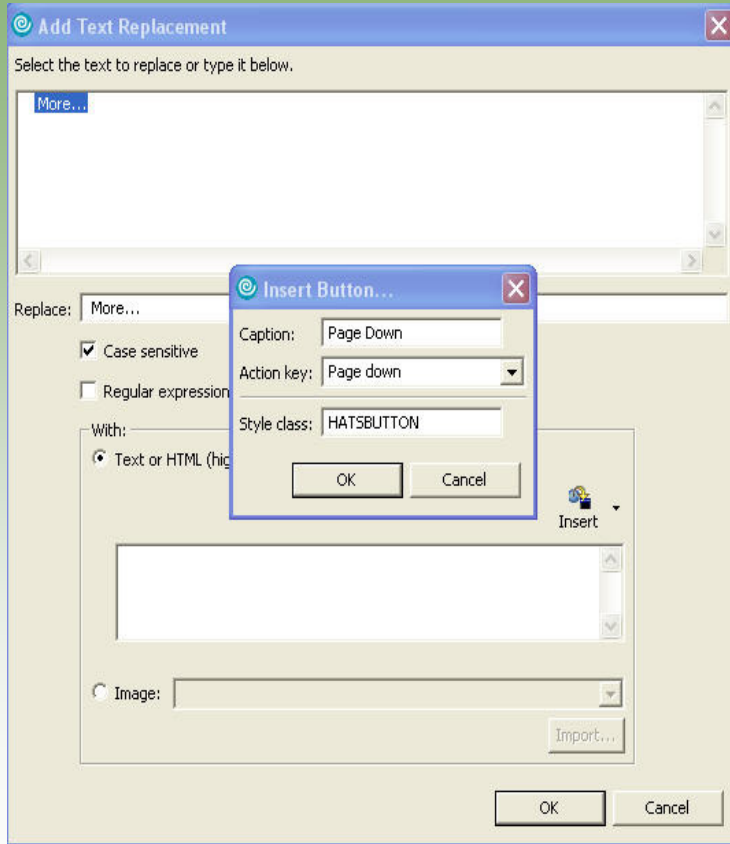
- Step Into
 - *Allows stepping from action to action inside of a screen.*
 - *To use, press F5 or click*
- Step Over
 - *Allows stepping from screen to screen (all actions encountered along the way are executed).*
 - *To use, press F6 or click*
- Step Return
 - *Allows you to finish playing the actions under a screen and go to the next screen.*
 - *To use, press F7 or click*
- Step Resume
 - *Plays the rest of the macro from the current point.*

Regular Expression Text Replacement

- Regular expression support in HATS allows a developer to describe a string (or set of strings) based on a pattern.
- Example:

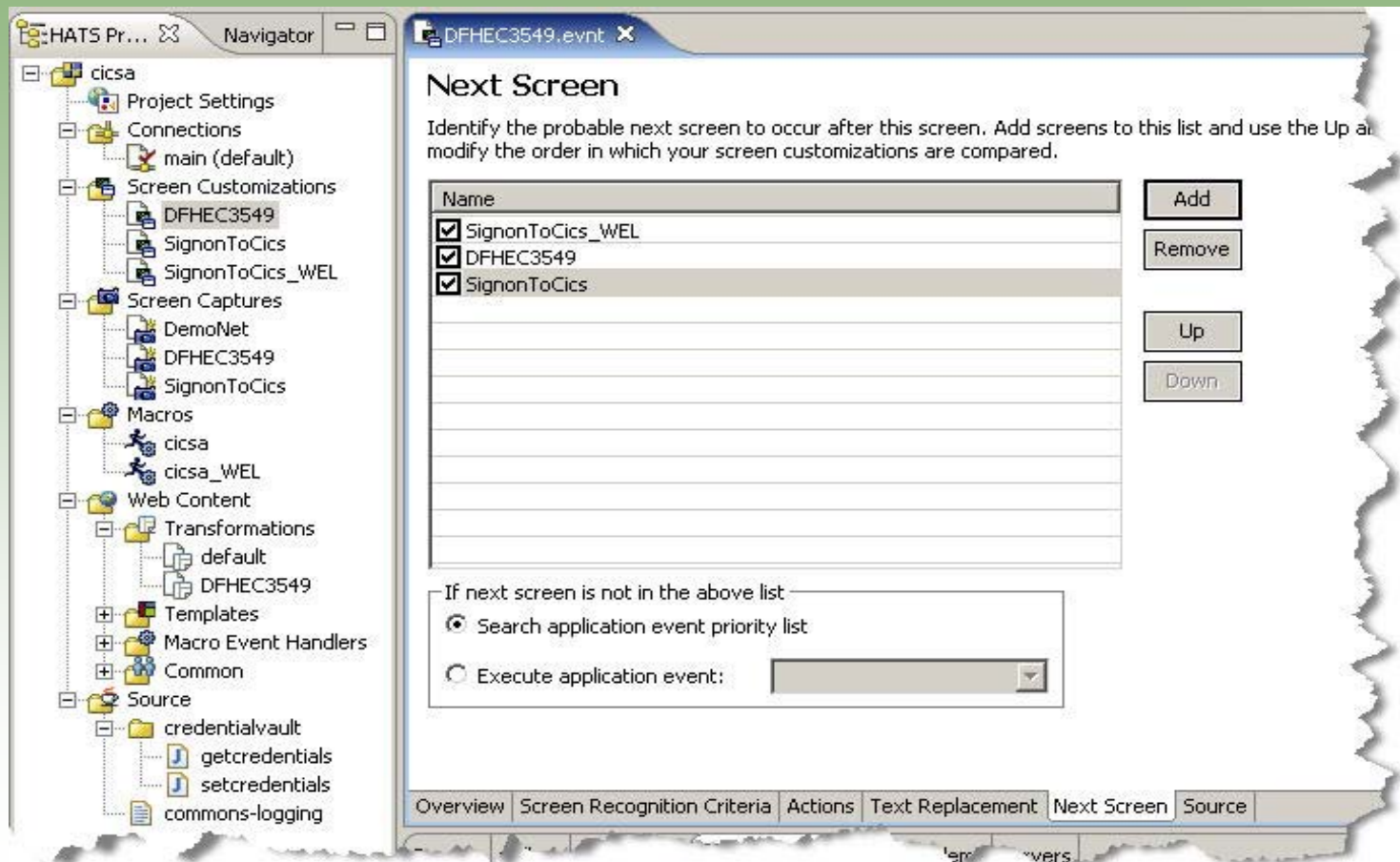


Text Replacement- Insert Button/Link



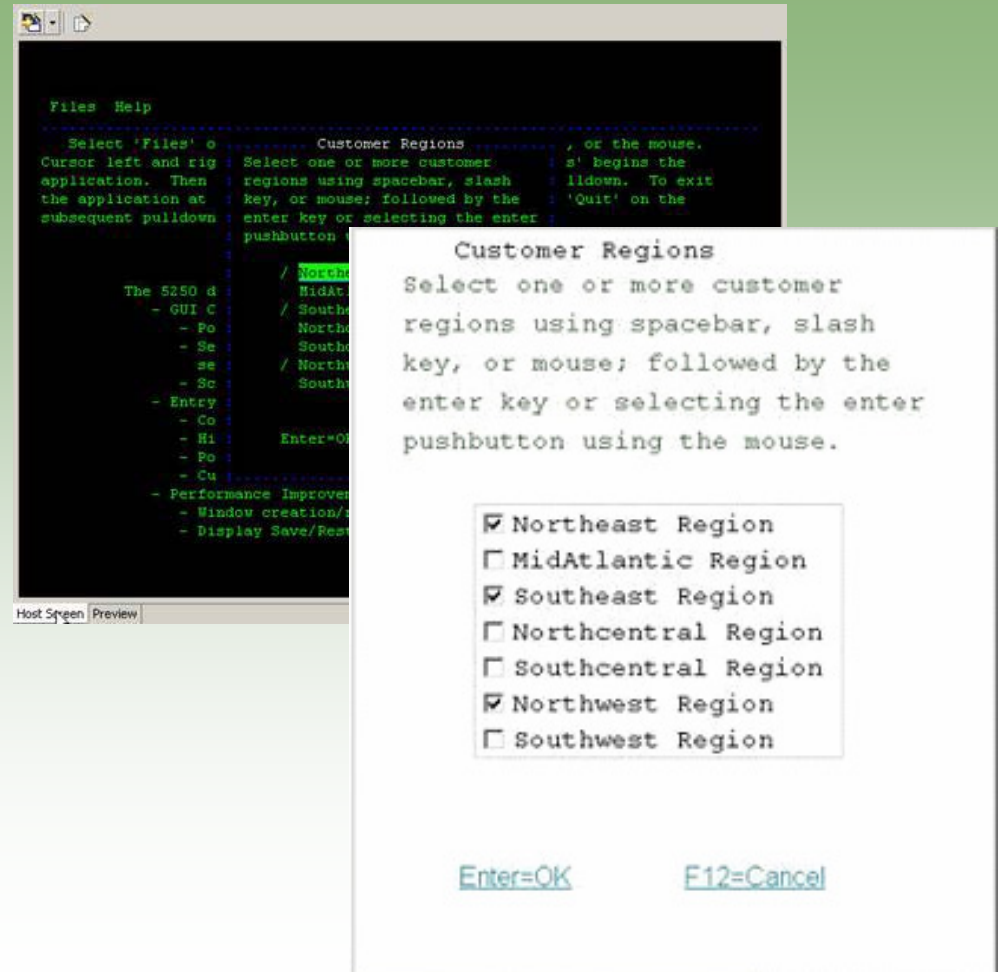
Identified Next Screens

- Improves Performance



5250 Limited ENPTUI support

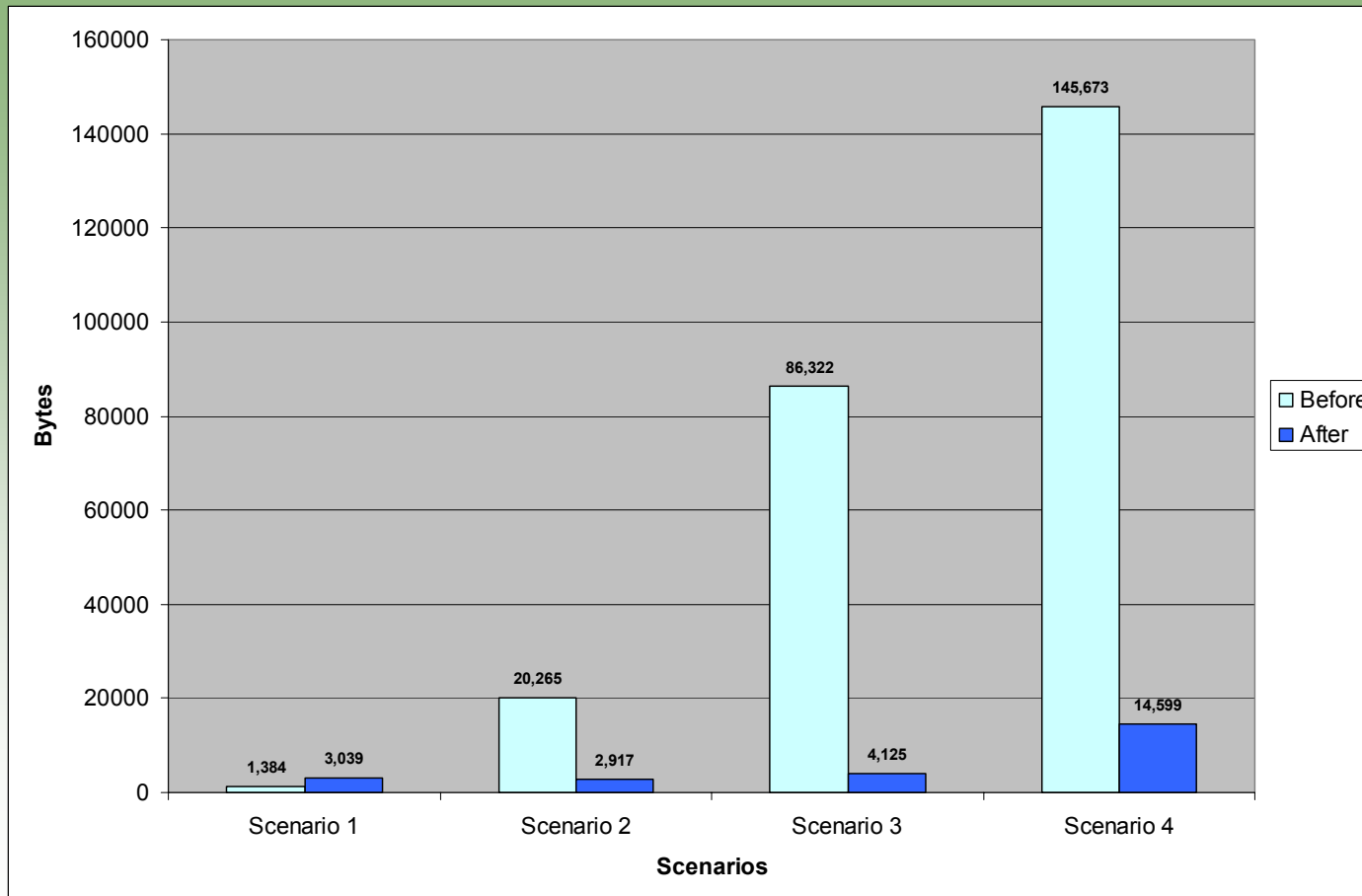
- Push Buttons
- Check Boxes
- Radio Buttons
- Single Selection Listbox
- Multiple Selection Listbox
- Popup Window
- Menu Bar
- Pull Down Menus



HTTP Compression Support

- **HATS compression support:**
 - *Significantly reduces the number of bytes sent over the network (see the next slide for more details). Example: Without compression, typical page sizes were 30-60K, after compression page sizes are ~ 2-3K.*
 - *Improves response time*
- **Supported on WebSphere Application Server 5.1 and WebSphere Application Server 6.0. Not supported when running in WebSphere Portal Server. Requires a browser that supports GZIP compression (all supported HATS browsers, with the exception of IE 5.2.3 on Mac, support GZIP).**
- **By HATS supporting compression out of the box, compression does not need to be configured or enabled on the HTTP server.**
- **Introduced in HATS 6.0.2**

Compression Before and After



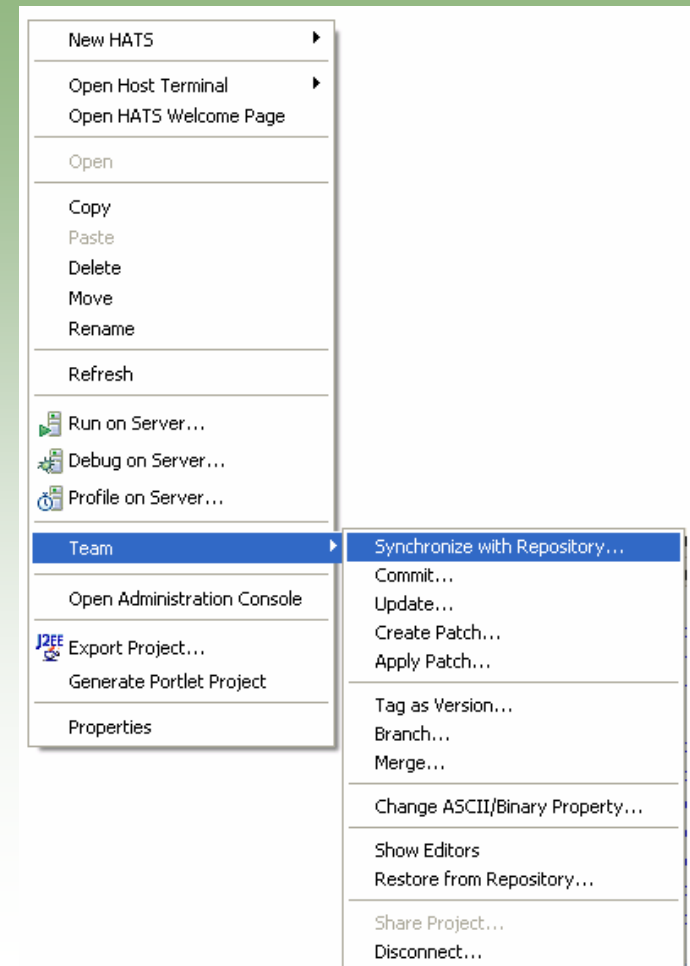
Scenarios:

- 1 – simple, customized screen
- 2 – simple, default rendered screen
- 3 – default rendering, with character by character rendering
- 4 – default rendering, with character by character rendering and positioning on protected text enabled

* Your actual numbers may vary, but similar results should be seen.

Team Functions Exposed

- Team functions are now exposed on the HATS Project view context menu. This enables HATS projects and artifacts to be easily shared with a supported repository (such as CVS or ClearCase).
- Note: Team functions are only displayed if the project has already been shared. You will need to use the Team menu from the Navigator view to share the HATS project before team functions will be displayed in the HATS Project view.
- Introduced in HATS 6.0.4



Debug and Profile on Server

- **Debug and Profile on Server are now exposed in the HATS Project view context menu (these functions have been available, but were not as easily accessible in previous versions of HATS).**
- **Both functions are provided by the Rational Software Development Platform.**
- **Debug on server allows you to step through Java code (such as HATS business logic) as the HATS application is running on the application server.**
- **Profile on server allows you to pinpoint the operations that take the most time, and helps you to easily identify repetitive execution behavior and to eliminate redundancy. It is useful for performance analysis and for gaining a deeper understanding of your application.**
- **These functions can be accessed by right-clicking a project or artifact from the HATS Project view or by selecting the HATS menu.**

 Run on Server...

 Debug on Server...

 Profile on Server...

Supported Platforms

- **Server**
 - *z/OS, i5/OS, Linux, Linux for zSeries, Linux for iSeries, Linux for pSeries, AIX, Windows 2003, Windows 2000, Windows XP, Solaris, HP Unix*
 - *WebSphere Application Server V5.1.x or V6.0.x*
- **Studio**
 - *Windows 2000, XP, or 2003*
 - *IBM Software Development Platform V6*
 - RWD
 - RAD
 - RSA
 - WDz
 - WDSC and WDSC Advanced
 - WID
- **WebSphere Portal Server 5.0.2.x or 5.1.x**

Case Study: Amica Insurance

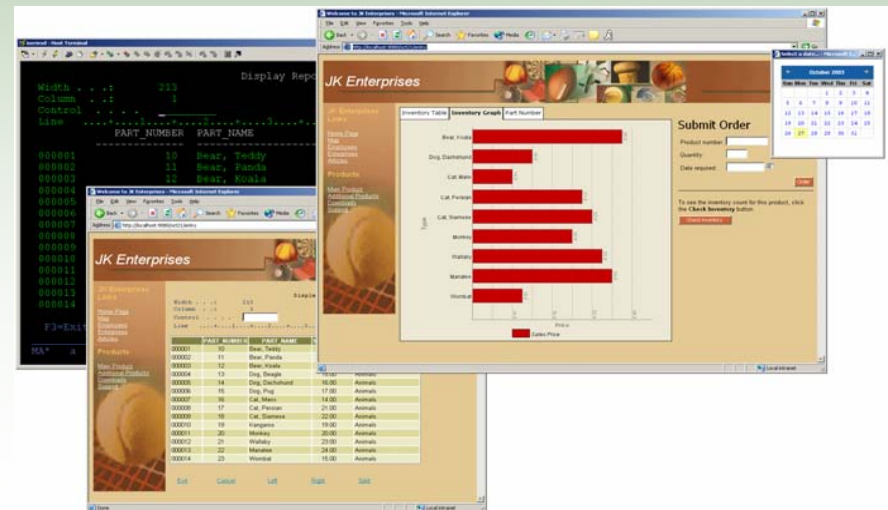
Recommended Skills



- **The HATS Studio is an integrated environment for building HATS applications – as with all tools, skills are developed over time. Ease-of-use has been a driving design goal since the first release (and was the theme for HATS version 6).**
- **HATS does not require Java skills. However, they can be leveraged for advanced integration (e.g. interacting with a database using JDBC) or when writing custom components and widgets.**
- **Although HATS is integrated into the WYSIWYG Rational Studio Page Designer (HTML editor) tool, HTML / Web skills are recommended when doing advanced customization.**
- **The good news : the skills required for advanced HATS development are reusable because HATS utilizes industry standard technologies (J2EE, Java, JSP, JavaScript, XML, HTML, CSS, etc).**

Summary of HATS Features and Value Propositions

- Host screens are converted to GUIs on the fly, in real time
- Improved navigation of host application
- Zero footprint on the desktop
- Combine screens and data from multiple applications
- Eliminates need to customize every screen
- Generate Web services from host transactions
- Exploits security & scalability of WebSphere Application Server and WebSphere Portal
- Extensible through IBM Rational Software Development Platform
- Supports iterative development



Resources – Comprehensive HATS Demo CD

- To request a Demo CD

Send an email to wsnfr@us.ibm.com. In your email, include the name of the CD (HATS V6 Demonstration), how many CDs are needed, the type of CD (customer or business partner), the mailing address, and your phone number.

- Development Assistance

Participate in WebSphere HATS development lab advocacy program. Development resource assigned for consultation. Contact Pratik Nanavati, pratik@us.ibm.com.

Other Online Resources

- **IBM WebSphere Host Integration Solution Product Page**
 - <http://www-306.ibm.com/software/webservers/hostintegration/>
- **Demos**
 - <http://websphere.dfw.ibm.com/atdemo/>
- **Webinars**
 - <http://www-306.ibm.com/software/webservers/hats/webinars/index.html>
- **Library, Brochures, Presentations, Redbooks**
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- **Trial Code**
 - <http://www14.software.ibm.com/webapp/download/product.jsp?s=p&id=GMDL-5BJRPP>
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