User Group

WebSphere – Legacy Application Modernization

GotheDistance

Sirius Computer Solutions Confidential

What is Legacy Modernization?

Sirius Computer Solutions Confidential

Modernization Steps

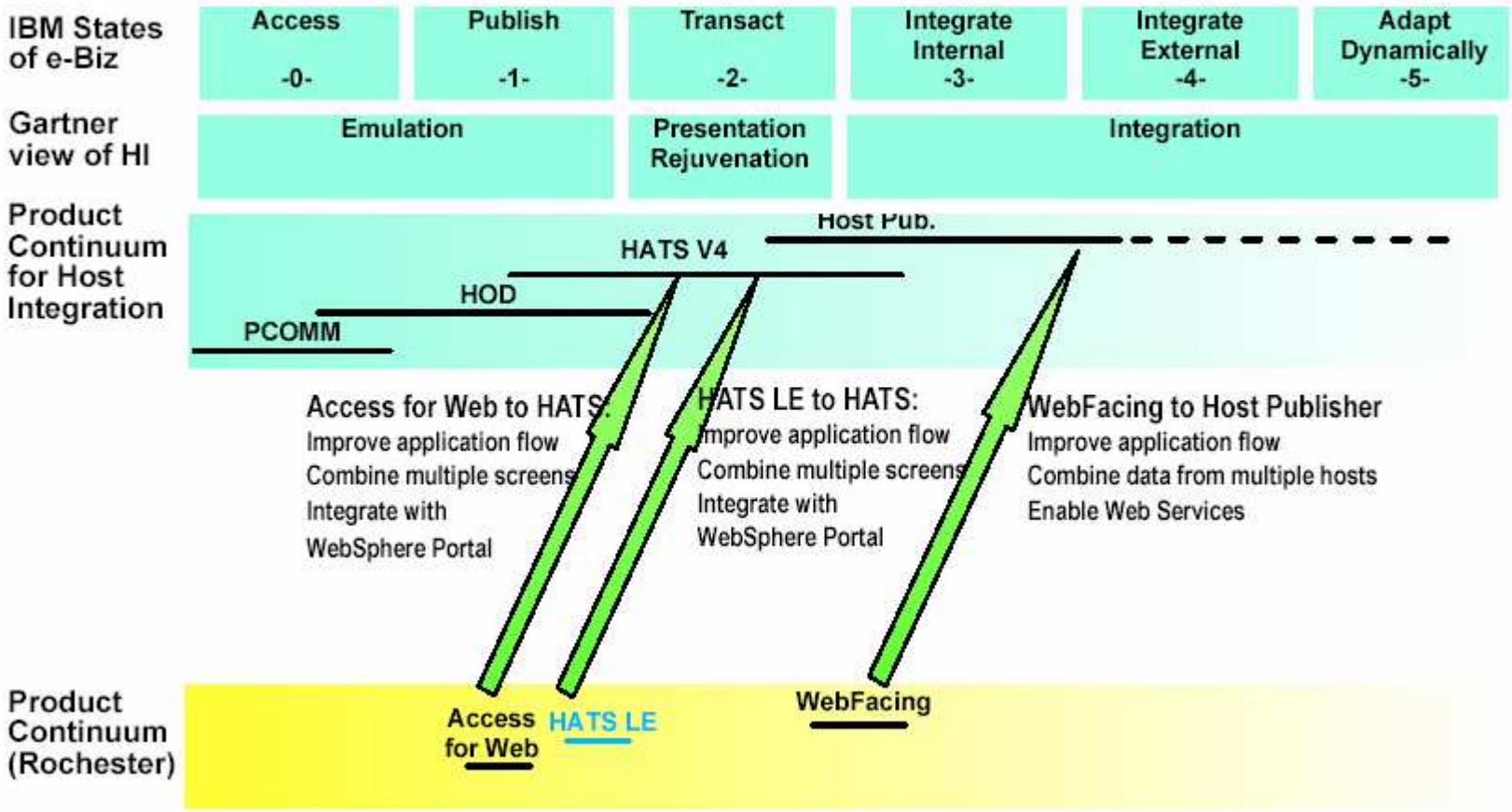
Today we will discuss this:

1) Native and Relational Database
2) Modern or Structured RPG Code
3) Browser Based 5250 with Text
4) Browser Based 5250 with GUI, HATS or WebFacing
5) New UI with PCML or Stored Procedures and Back-end Legacy Application
6) Advanced Database Techniques, RI (Referential Integrity) or Triggers
7) Advanced Printing, PDF/HTML to Client, Integrated Graphics, Fax/Email Options, Page Segmentation.
8) New "Interactive" Development, replaces the old 5250 applications, 100% Java Based
9) Re-Write Old Interactive Applications, 100 % Java Based
10) New and Re-write of the Back-end Batch/Reporting Applications

GotheDistance

Migration Paths

Potential Migration Paths for the iSeries Market



Sirius Computer Solutions Confidential

GotheDistance

The Tools

Sirius Computer Solutions Confidential

WDSc

WebSphere Development Studio for iSeries

- Combines Legacy and web development in one offering
  - **Host & client tools**
  - **RPG, COBOL, C & C++**
  - **Java, HTML, XML, & Web Services**
- WebSphere Development Studio Client (WDSc) is Windows tool bundle
- 1 copy of WDSc is shipped with WebSphere-Express for iSeries

90,000 copies shipped since May 23, 2001!

WebSphere Development Studio for iSeries

GotheDistance

Sirius Computer Solutions Confidential

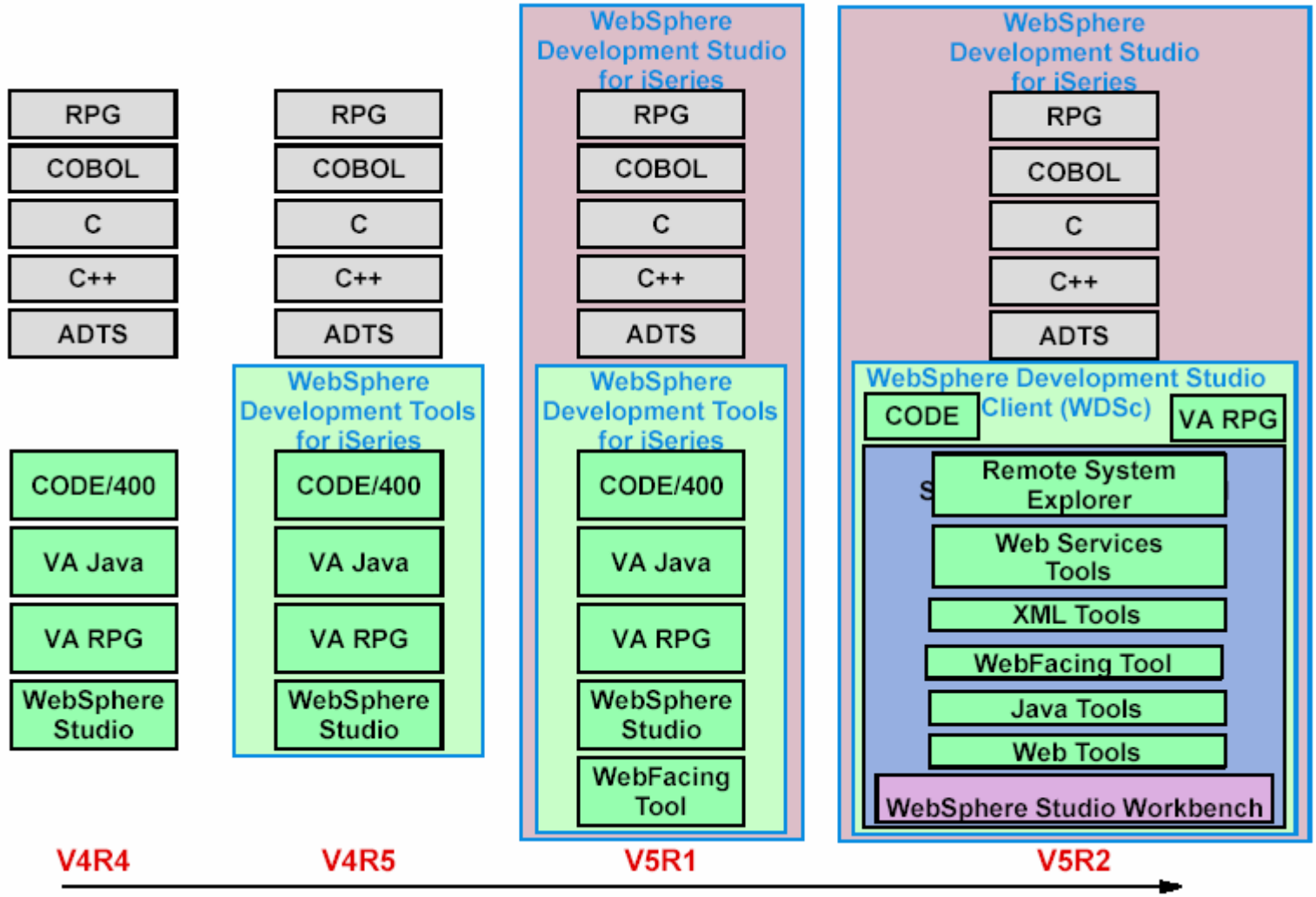
WDSc

A single, comprehensive development environment

GotheDistance

Sirius Computer Solutions Confidential

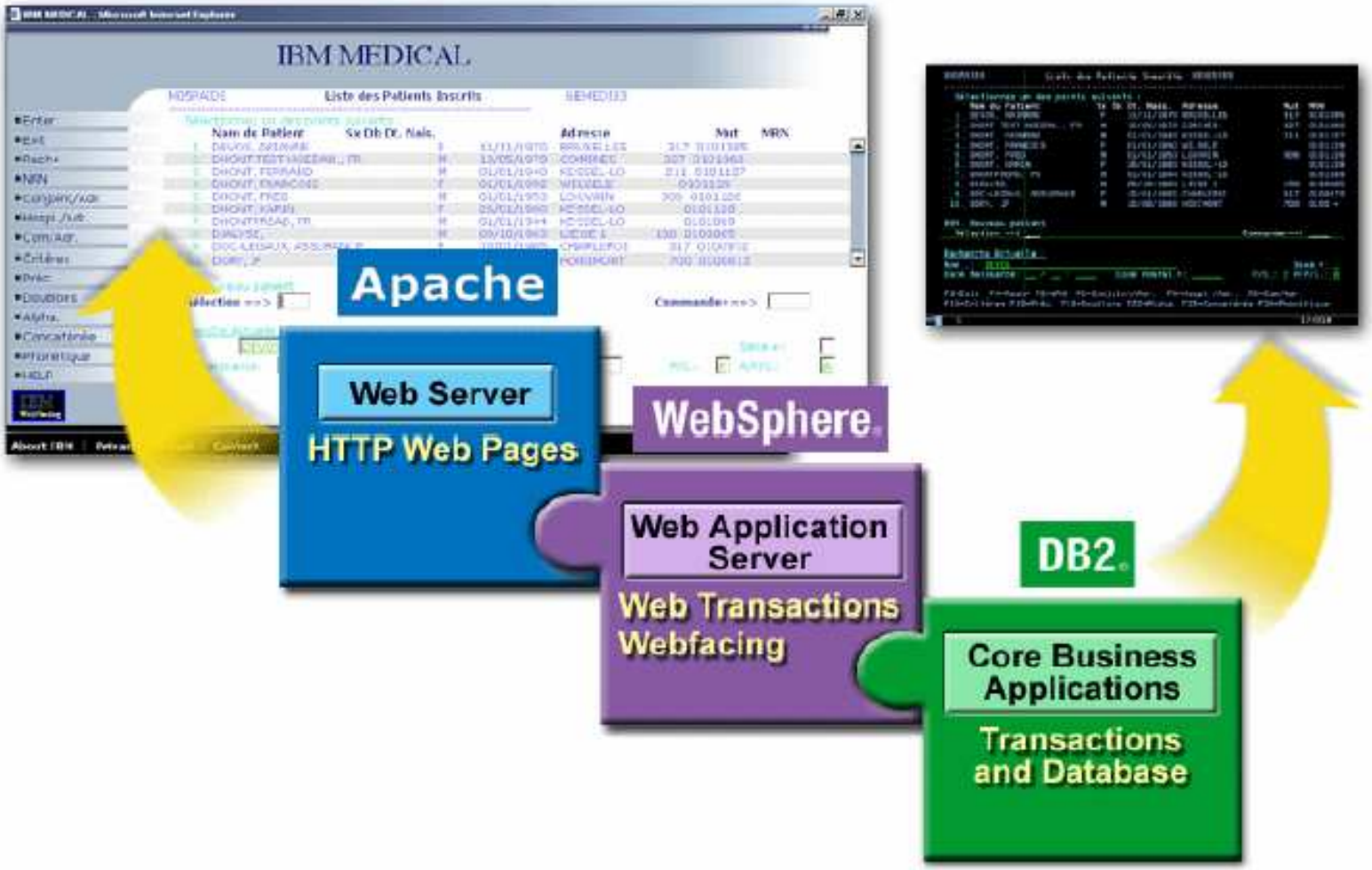
iSeries Tools Progress



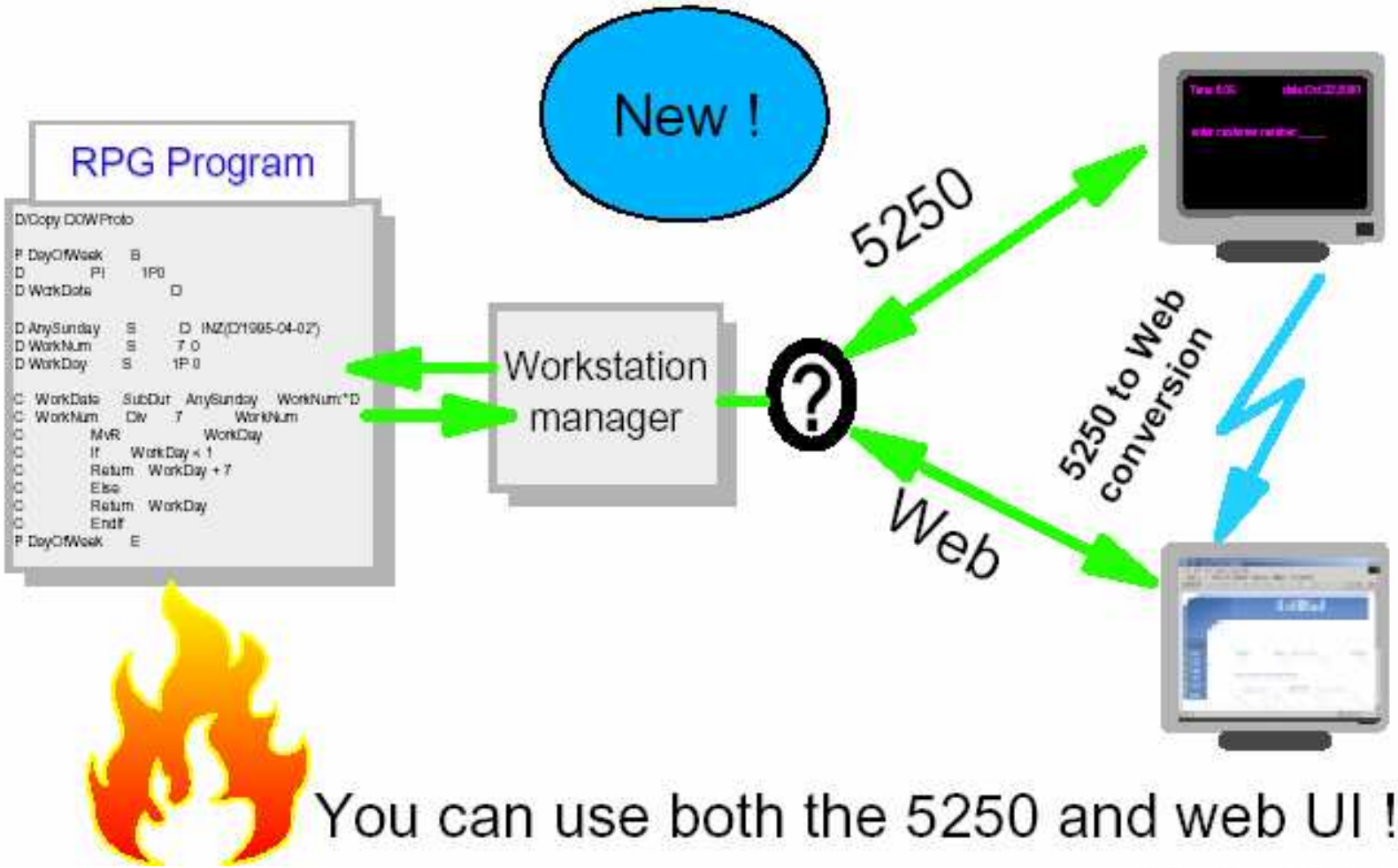
GotheDistance

WDSc DEMO

WebFacing


IBM MEDICAL
Apache
Web Server
HTTP Web Pages
WebSphere
Web Application Server
Web Transactions
Webfacing
DB2
Core Business Applications
Transactions and Database

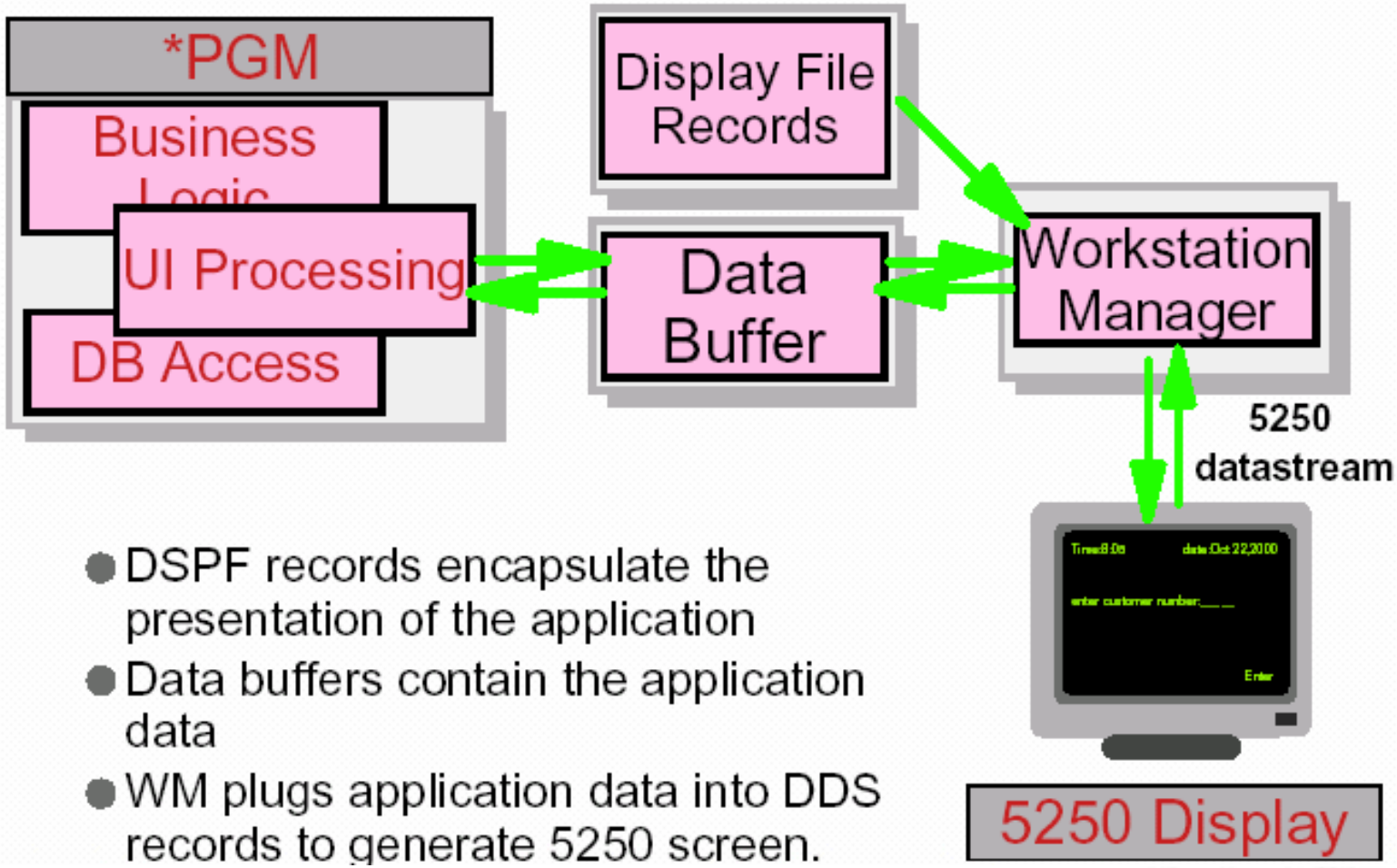
WebFacing



You can use both the 5250 and web UI !

GotheDistance

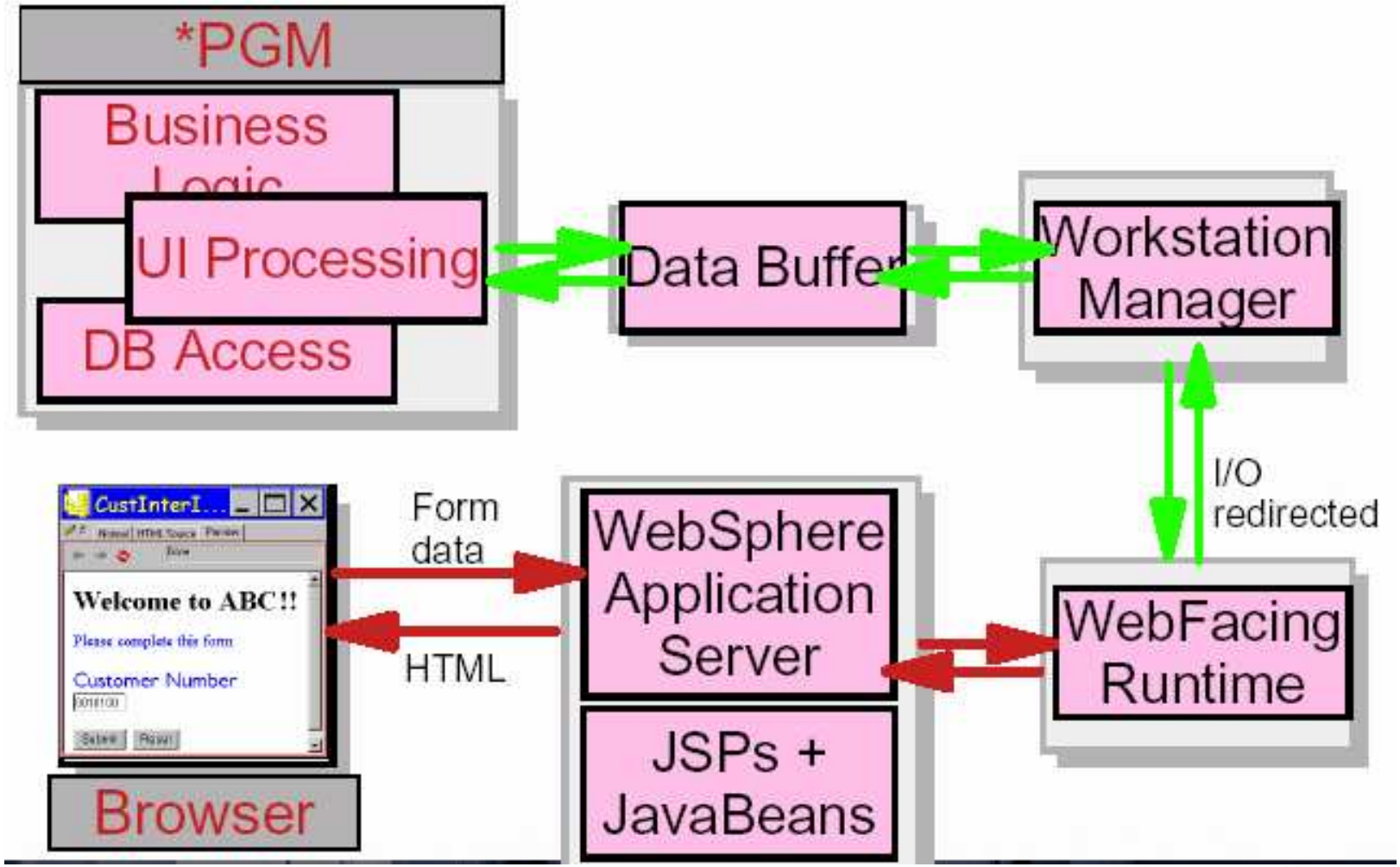
As it stands today



- DSPF records encapsulate the presentation of the application
- Data buffers contain the application data
- WM plugs application data into DDS records to generate 5250 screen.

Sirius Computer Solutions Confidential

WebFacing

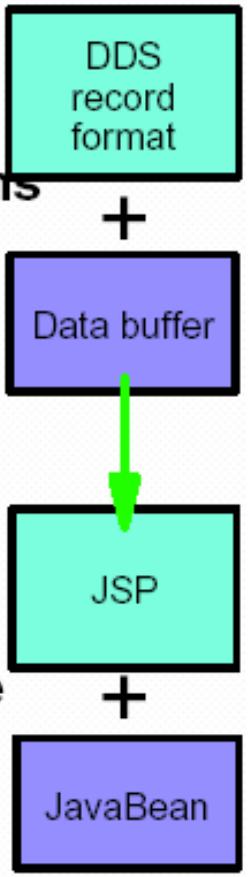


GotheDistance

Sirius Computer Solutions Confidential

From DDS to JSP

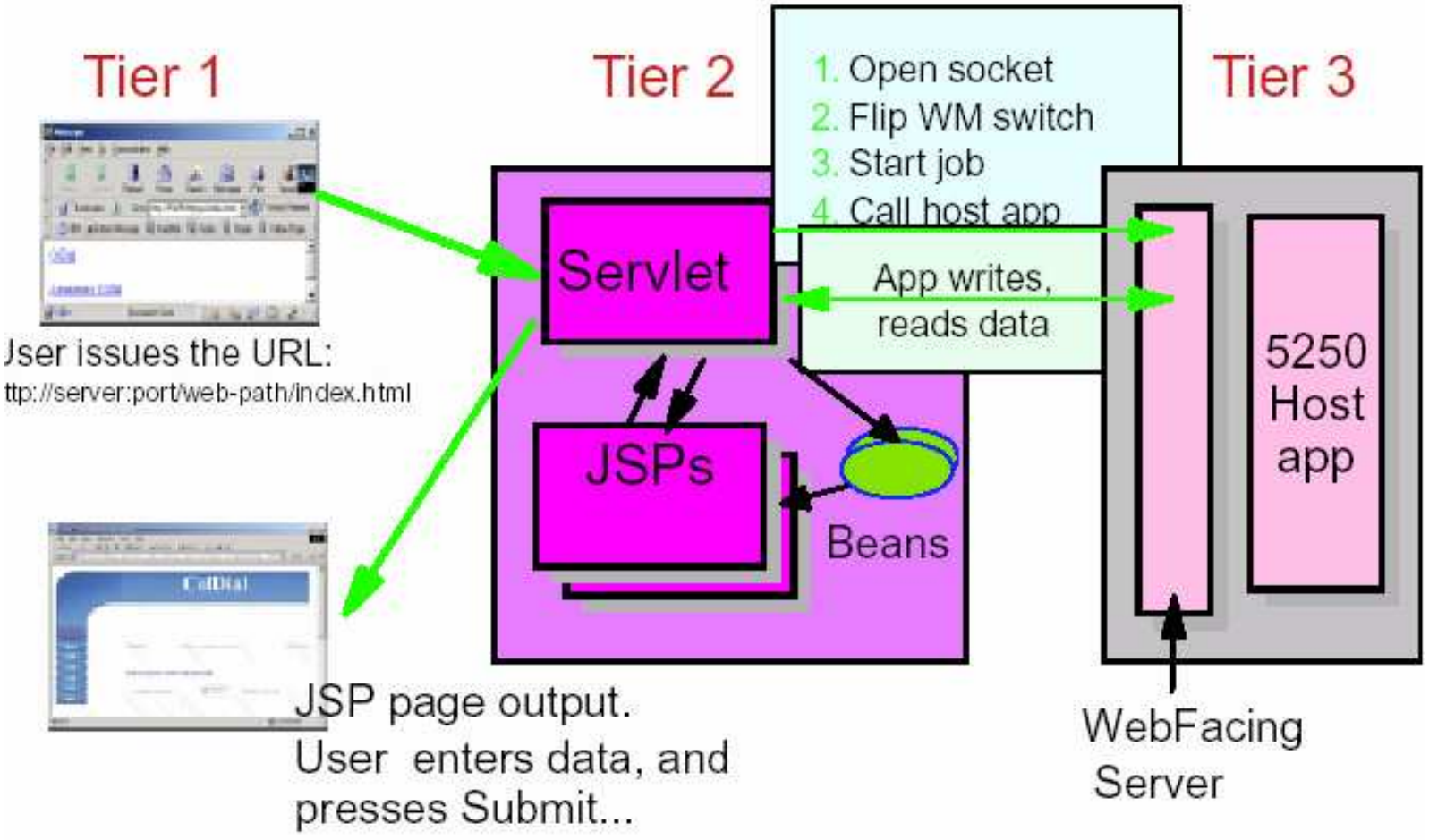
- Development time wizard:
  - Converts DDS to JSPs:
    - **Select DDS members to convert**
    - **Creates one Java server page and 3 java beans per record format:**
      - ✔ Bean holds data,view,and feedback for record format
      - ✔ JSP displays output and prompts for input
    - **Select from various look-and-feels**
  - Creates an "invocation page" per conversion: (index.html)
    - **Web page with links**
    - **Each link results in starting a job, running the user-supplied CL command which starts the application contained the converted DSPFs**



GotheDistance

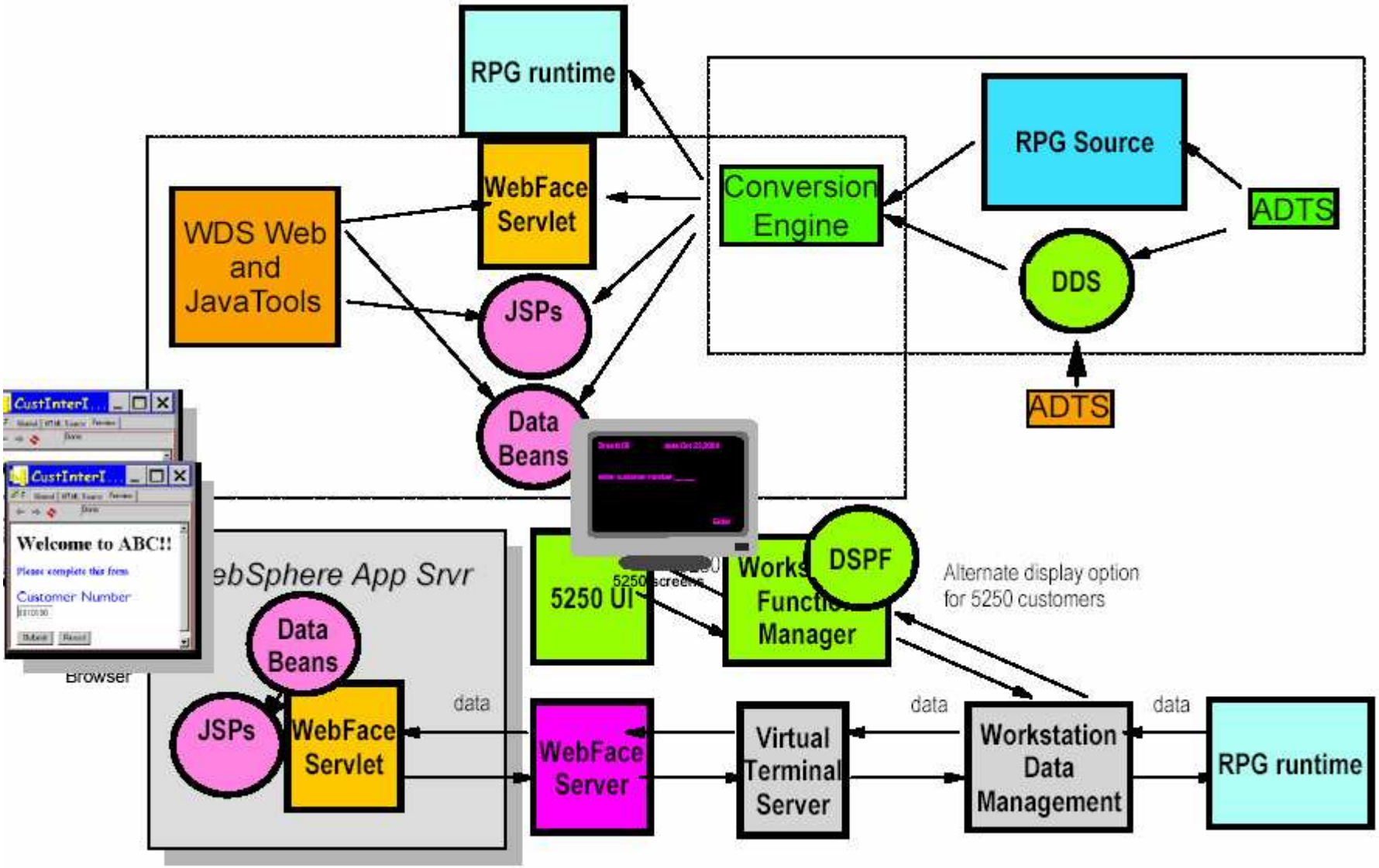
Sirius Computer Solutions Confidential

The Big Picture



GotheDistance

Sirius Computer Solutions Confidential


RPG runtime
WebFace Servlet
Conversion Engine
RPG Source
ADTS
WDS Web and JavaTools
JSPs
DDS
Data Beans
ADTS
Welcome to ABC!!
Please complete this form
Customer Number
Browser
ebSphere App Srvr
Data Beans
JSPs
WebFace Servlet
data
5250 UI
DSPF
Manager
Alternate display option for 5250 customers
WebFace Server
Virtual Terminal Server
data
Workstation Data Management
data
RPG runtime

iSeries Access for the Web

End users can leverage business information, applications, and resources across an enterprise by extending the iSeries resources to the client desktop through a web browser

Provides access to iSeries through a browser

- 5250 access
- Access to database, integrated file system, printers, output queues, jobs
- Can run batch commands and send/receive messages

It has the following advantages:

- Is server based
- Requires only a browser on the client, no configuration required at desktop, no applets installed on desktop
- Uses industry standard protocols - HTTP, HTTPS and HTML

GotheDistance

Functions you can perform

My Personal Folder ★

Print
- Printer output
- Printers
- Internet Printers
- Printer shares
- Output Queues

Database
- Tables
- My Requests
- Run SQL
- Copy Data to Table
- Import Requests

5250 ★
- Start 5250 Session

Commands
- Run commands (Batch)

Files
- Browse Files (in IFS)
- File Shares (in NetServer)

Messages ★
- Display Messages
- Send Messages
- Operator Messages
- Message Queue

Jobs ★
- User Jobs
- Server Jobs

(Star) = requires V5R2, 5722-XH2, iSeries Access for Web

Customize
- Administrator controls access to functionsu by user or group of users:
  - Can customize front page
  - Can limit what tasks can be performed

GotheDistance

Sirius Computer Solutions Confidential

iSeries Access for the Web

iSeries Access for Web

iSeries Access for Web is a lightweight, browser-based access to your iSeries servers

Pure Java servlet-based access

- iSeries Access for Web is a set of servlets that run on the iSeries servers as extensions to the HTTP server. It provides access to functions such as database, file, print, and messages on the iSeries server.

Industry-standard protocol

- iSeries Access for Web uses the industry standard HTTP and HTTPS protocols and does not use any proprietary TCP/IP ports and protocols. Firewall issues are much more manageable as a result.

Lightweight Access

- The intent of iSeries Access for Web is lightweight and casual access of iSeries servers from a web browser. Most of the iSeries Access for Web functions have minimal broswer requirements and would work with almost any browser on any platform.

Server-based

- iSeries Access for Web is entirely server based. There is no client code to install and manage. Simply install and configure on the server, access from any web browser.

Object-level security

- Access to the iSeries data is based on iSeries object level security. Users and groups have only access to the data they are authorized to.

Fully customizable

- Access to iSeries Access for Web functionality can be restricted for users and groups of users. iSeries Access for Web is fully customizable.

HTML and other internet mime types

Responses from the iSeries Access for Web servlets are formatted and tagged with the appropriate mime types. Some of the mime types used are (others may be used and added in the future):

- HTML (text/html)
- binary (application/octet-stream)
- text (text/plain)
- MS Excel (application/vnd.ms-excel)
- Lotus 1-2-3 (application/vnd.lotus-1-2-3)
- GIF images (image/gif)
- TIFF images (image/tiff)
- HP PCL (application/vnd.hp-PCL)
- AFP (application/vnd.ibm.modcap)

In most cases, the request implies the resulting data type. iSeries Access for Web servlets retrieve the data, format the data in appropriate formats, tags it with the appropriate mime type, and sends the response back to the client

Sirius Computer Solutions Confidential

HATS LE (Limited Edition)

- **Part of iSeries Access Family - 5722-XW1**
  - **Available 6/30/03**
    - Will automatically ship with new orders for 5722-XW1
    - Existing 5722-XW1 customers can order no-charge Feature number 2646 to receive HATS - Express in iSeries Client Access Family
    - Feat 2646 will also include Host Pub V5
  - **Subset of HATS**
  - **Does not support individual screen customization (at a glance comparison)**

GotheDistance

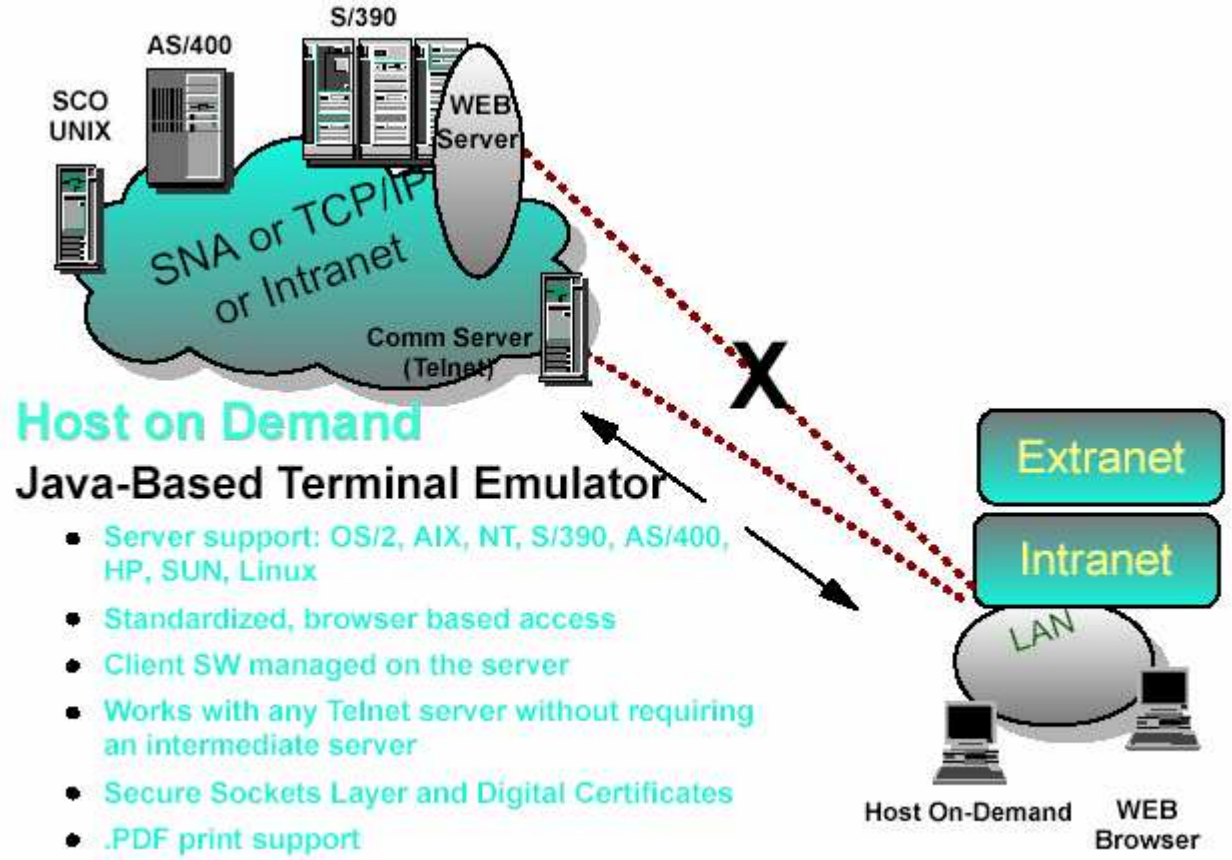
HATS LE

- **Converts 5250 screens to a point-&-click Web interface**
  - Delivers HTML to the desktop
  - Only software needed on the client is a Web browser
- **Works on all 5250 screens**
  - Use customer-provided HTML or stock HTML templates included with product
- **Screens are converted on the fly, in real time**
  - Selection lists can be converted to hot links, buttons, drop-down menus, or option lists (radio buttons)
  - PF keys are can be converted to buttons or hot links
- **No programming necessary**
  - Doesn't break if changes are made to 5250 application

A quick and easy way to put iSeries applications on the Web

GotheDistance

Host On Demand



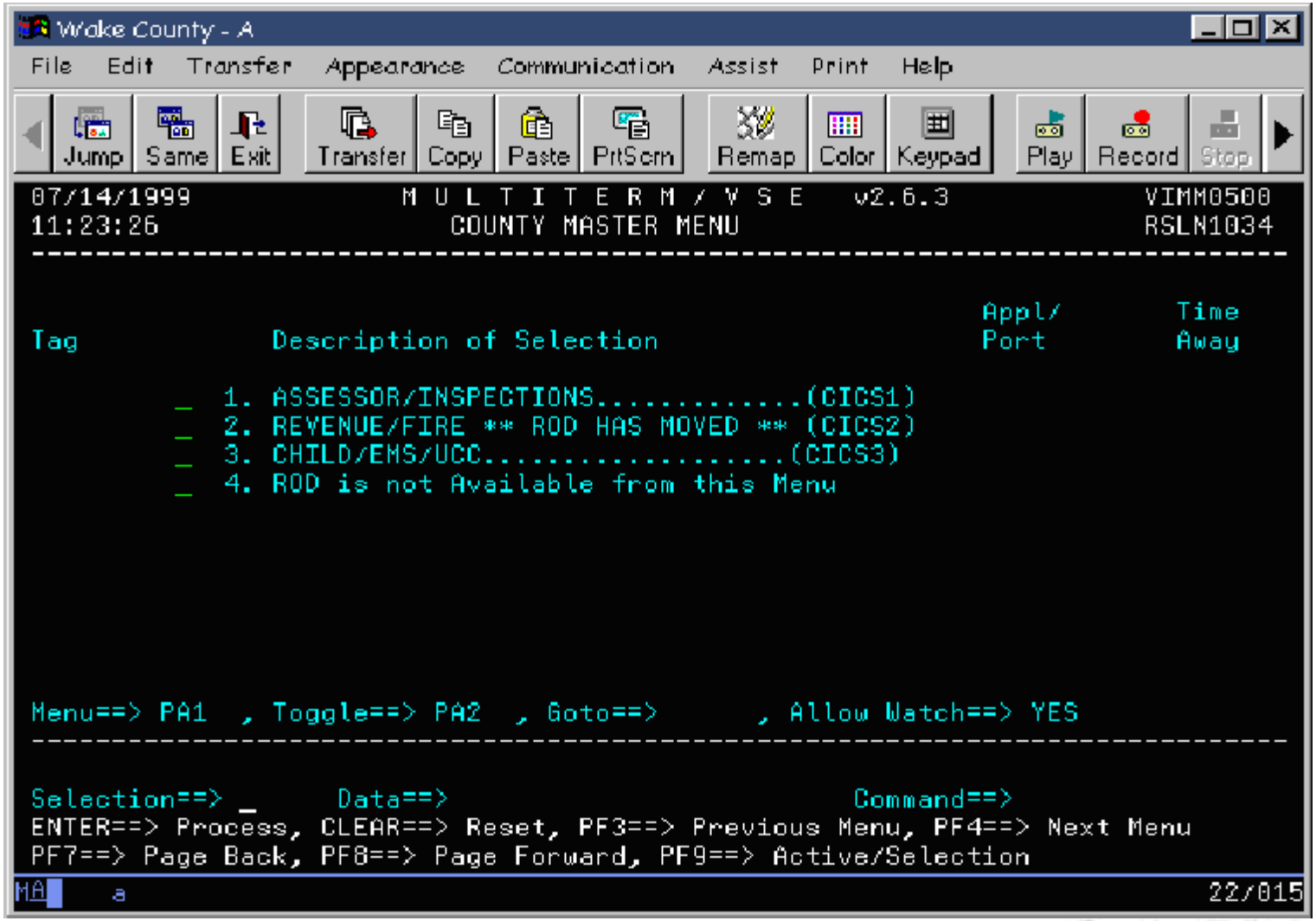
Host on Demand

Java-Based Terminal Emulator

- Server support: OS/2, AIX, NT, S/390, AS/400, HP, SUN, Linux
- Standardized, browser based access
- Client SW managed on the server
- Works with any Telnet server without requiring an intermediate server
- Secure Sockets Layer and Digital Certificates
- .PDF print support
- Secure File Transfer Protocol client

GotheDistance

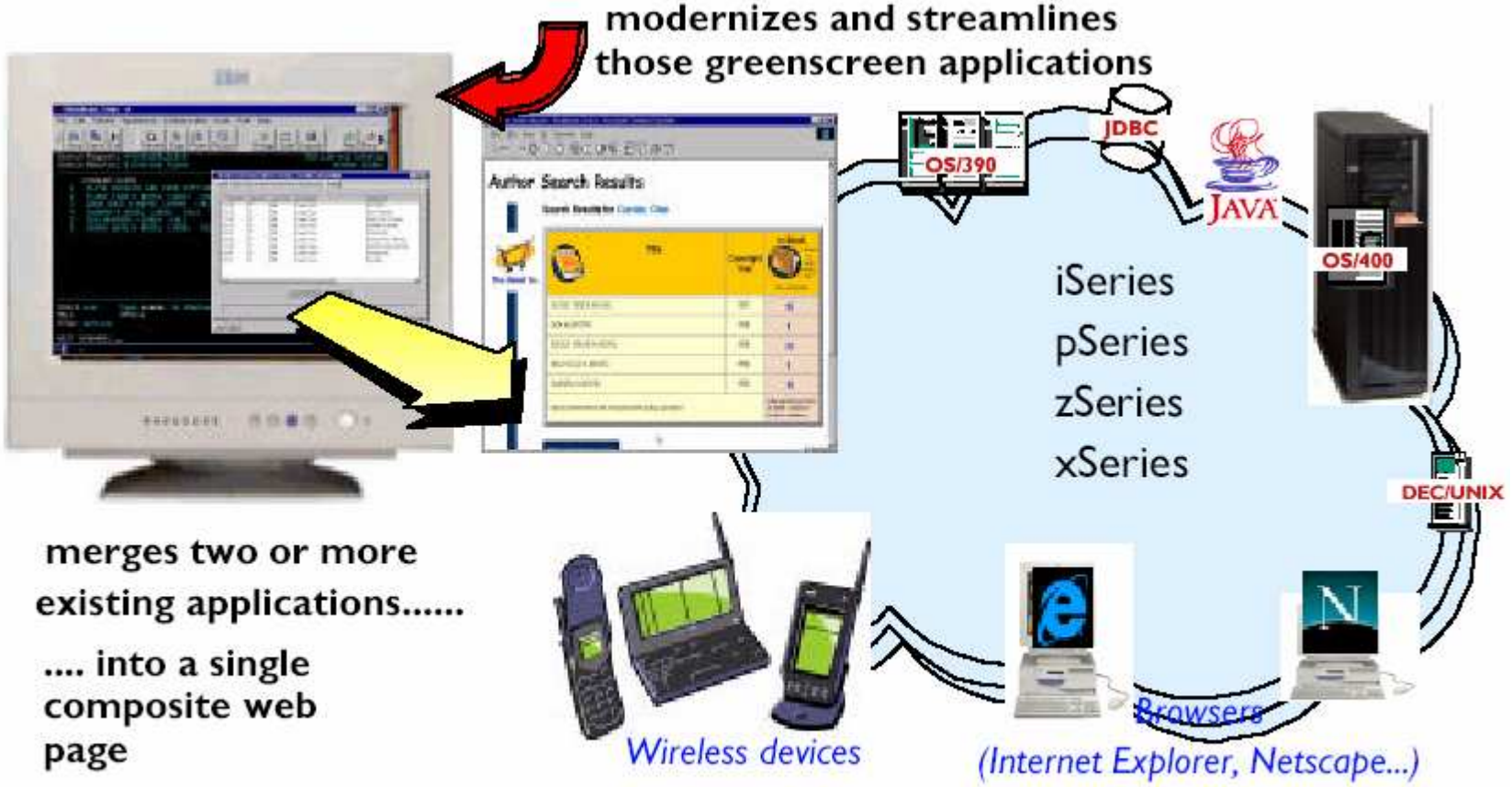
HOD



Sirius Computer Solutions Confidential

GotheDistance

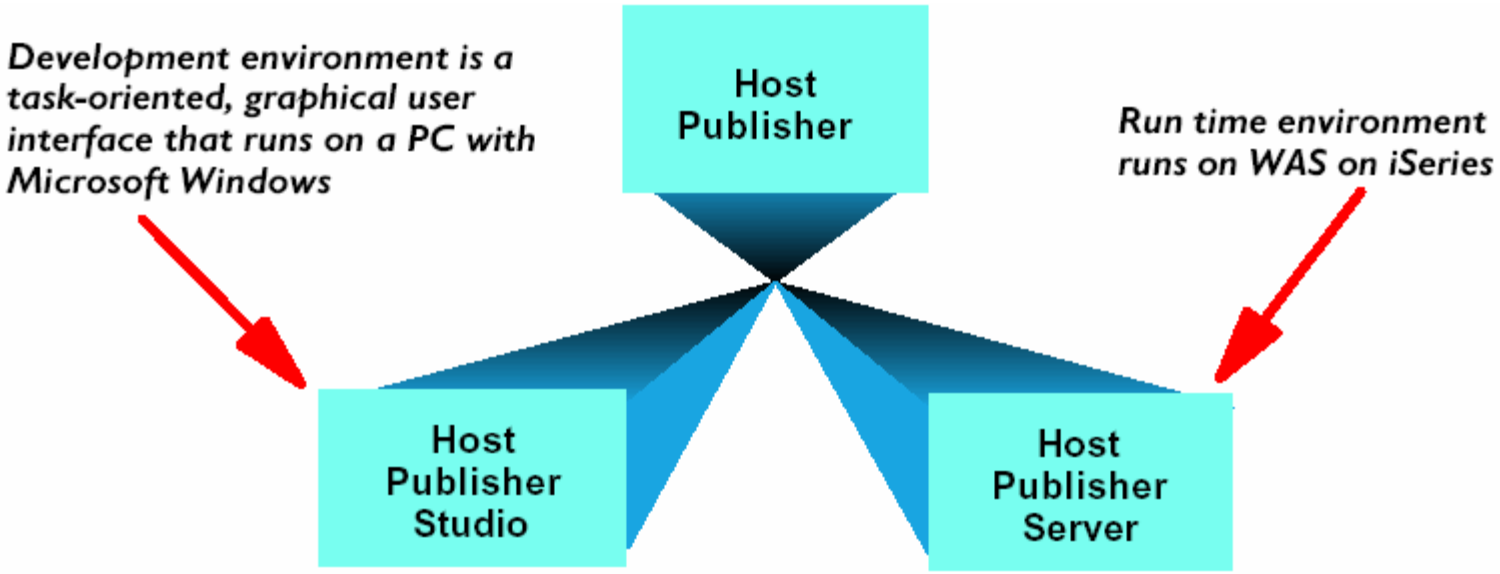
Host Publisher



Turns host applications into e-business applications for web browser users

GotheDistance

Key Components



Development Environment

- Generates Integration Objects
- Contains Java bean factories
- Generates Java Server Pages

Run Time Environment

- Contains session management
- Provides a run-time administration servlet
- Has log and trace management
- Contains Java classes for connection management
- Provides Servlet API support

Sirius Computer Solutions Confidential

GotheDistance

What are the Steps?

1. **Install/configure Host Publisher Server in WAS**
   - get it ready for use
2. **Start the WebSphere Host Publisher Studio**
   - Host Access (5250, 3270, VT) or Database Access (JDBC) paths
3. **Step through the application or host screens -- capturing the information you wish to publish**
   - generates Java beans called Integration Objects
4. **Import the Integration Objects into the Host Publisher Application Integrator (studio)**
   - generates JSPs and J2EE.ear files
5. **Perhaps polish your application further**
   - Could use a product in the WebSphere Studio family or other products to enhance the graphical look of the pages
6. **Install the J2EE files on the application server using WAS Administrator**
7. **Ready for Web users to enter url to access the application**

Sirius Computer Solutions Confidential

GotheDistance

Host Publisher

Host Publisher Studio is divided into 3 parts for creating and managing a project

1. **'Host Access' for your existing 5250 applications**
   - Generates JavaBeans called Integration Objects
2. **'Database Access' is used to create new SQL requests**
   - Generates SQL Integration Objects
3. **'Host Publisher Studio' / 'Application Integrator'**
   - Generates HTML, JSPs, and J2EE.ear files

GotheDistance

The Skills Needed

- You must be proficient with the host application or database
- You will use the Host Publisher Studio wizards to create java objects
  - Do not need to be a Java programmer
- You will use the Host Publisher Studio wizards to build Web pages for the applications
  - Basic JSP knowledge is required to modify the applications

Host Publisher Studio provides the tools to develop web-enabled applications

GotheDistance

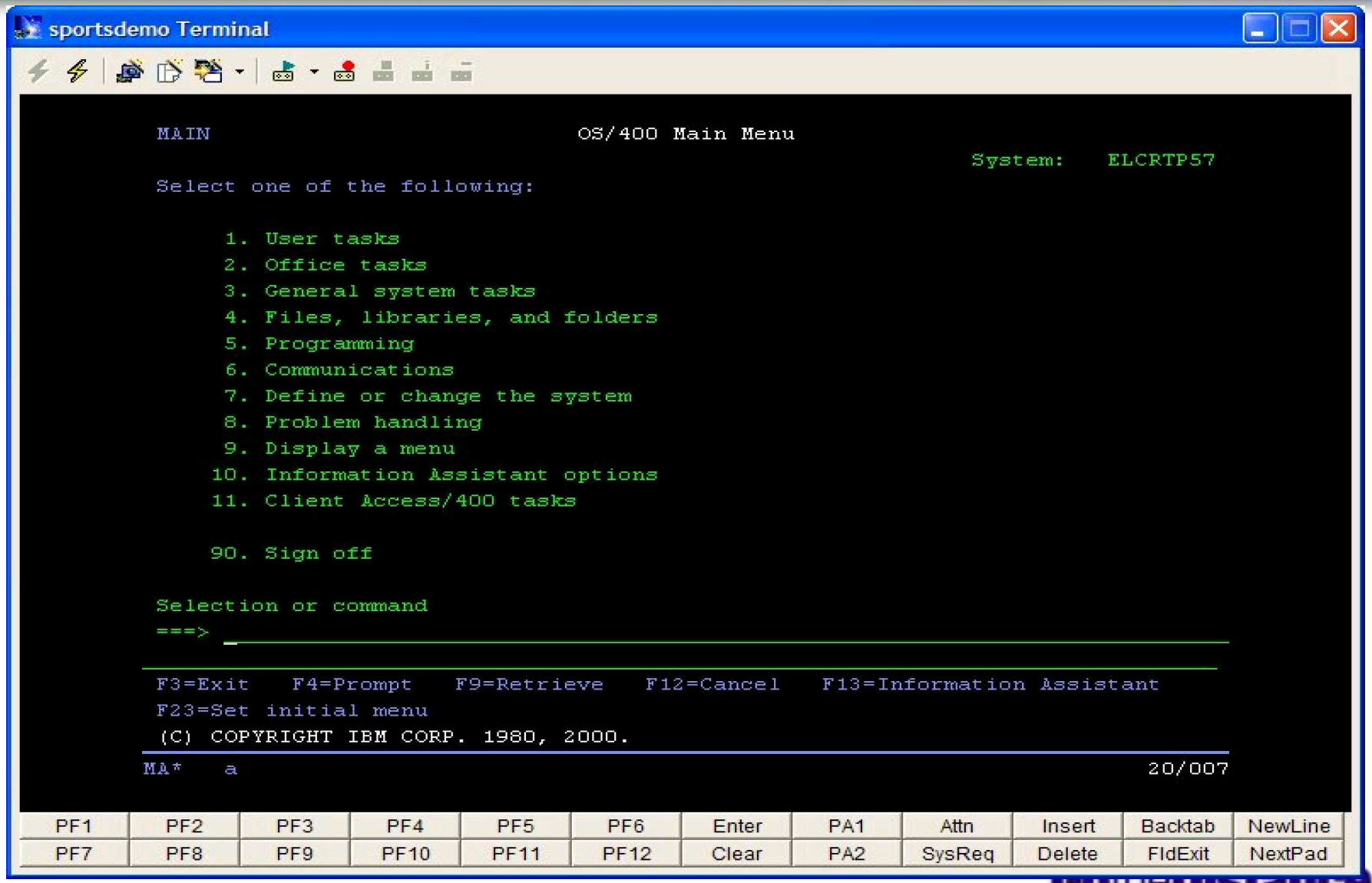
HATS

What is Host Access Transformation Server (HATS)?

- A Web-to-host HTML emulator...
- with a rules-based transformation engine that...
- converts green screens to graphical user interfaces in real time, and...
- significantly improves the navigation and productivity of host applications.

GotheDistance

Traditional Green Screen



HATS Default Transformation

What is HATS?

- A **Web-to-host HTML emulator...**
- with a rules-based transformation engine that...
- converts green screens to graphical user interfaces in real time, and...
- significantly improves the navigation and productivity of host applications.

- *Zero-footprint, zero-download*
- *Only software needed on the client is a Web browser*
- *Non-invasive; no need to access or modify source code*
- *Supports 3270 and 5250 hosts*

GotheDistance

What is HATS?

- A Web-to-host HTML emulator...
- **with a rules-based transformation engine** that...
- converts green screens to graphical user interfaces in real time, and...
- significantly improves the navigation and productivity of host applications.

- *Default rules allow host applications to be on the Web within hours of loading the HATS software*
- *No requirement for programming skills*
- *No need to customize every screen*
- *Add further customization at your own pace*

Sirius Computer Solutions Confidential

GotheDistance

What is HATS?

- A Web-to-host HTML emulator...
- with a rules-based transformation engine that...
- **converts green screens to graphical user interfaces in real time,** and...
- significantly improves the navigation and productivity of host applications.

- *On-the-fly screen conversion using the rules-based transformation engine*
- *HATS does not "break down" when changes are made to the host application*

Sirius Computer Solutions Confidential

GotheDistance

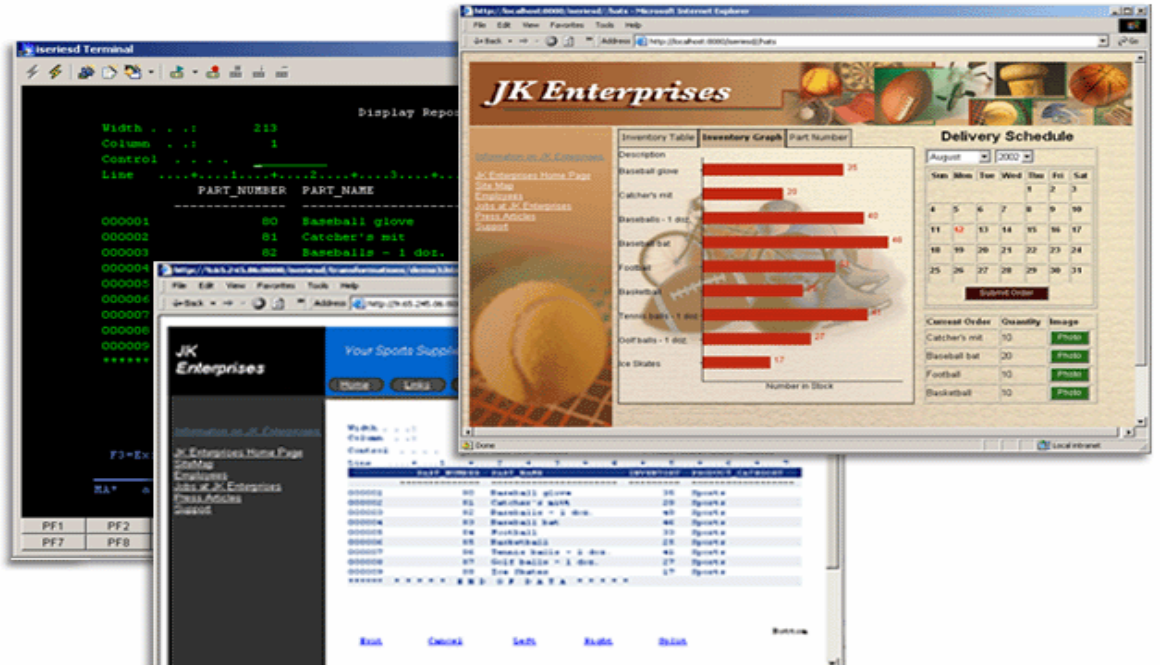
What is HATS?

- A Web-to-host HTML emulator...
- with a rules-based transformation engine that...
- converts green screens to graphical user interfaces in real time, and...
- **significantly improves the navigation and productivity of host applications.**

GotheDistance

Improves Navigation & Productivity of Host Applications

- Macros & global variables
  - ►Skip unneccesary screens; combine screens
  - ►Enter data on behalf of the end user
  - ►Store end user input as global variables; prefill text entry fields
- Screen customization
  - ►Add buttons, hot links, drop-down menus, valid value lists
  - ►Modify graphics, fonts. colors. and lavout
- Tabbed folders
  - ►Wizard-based
- Bar and line graphs
  - ►Wizard-based
- Add business logic
- Local print support
- Native keyboard support



Sirius Computer Solutions Confidential

Leverage Your Current Investments

- Continue to use your existing business applications as is
  - No change or access required to original application source code
- Transformed application can maintain the original application screen flows
  - Retraining not necessary
- HATS applications can grow with you as you move into more advanced states of e-business!

OS/390
z/OS

OS/400

Java

RPG

COBOL

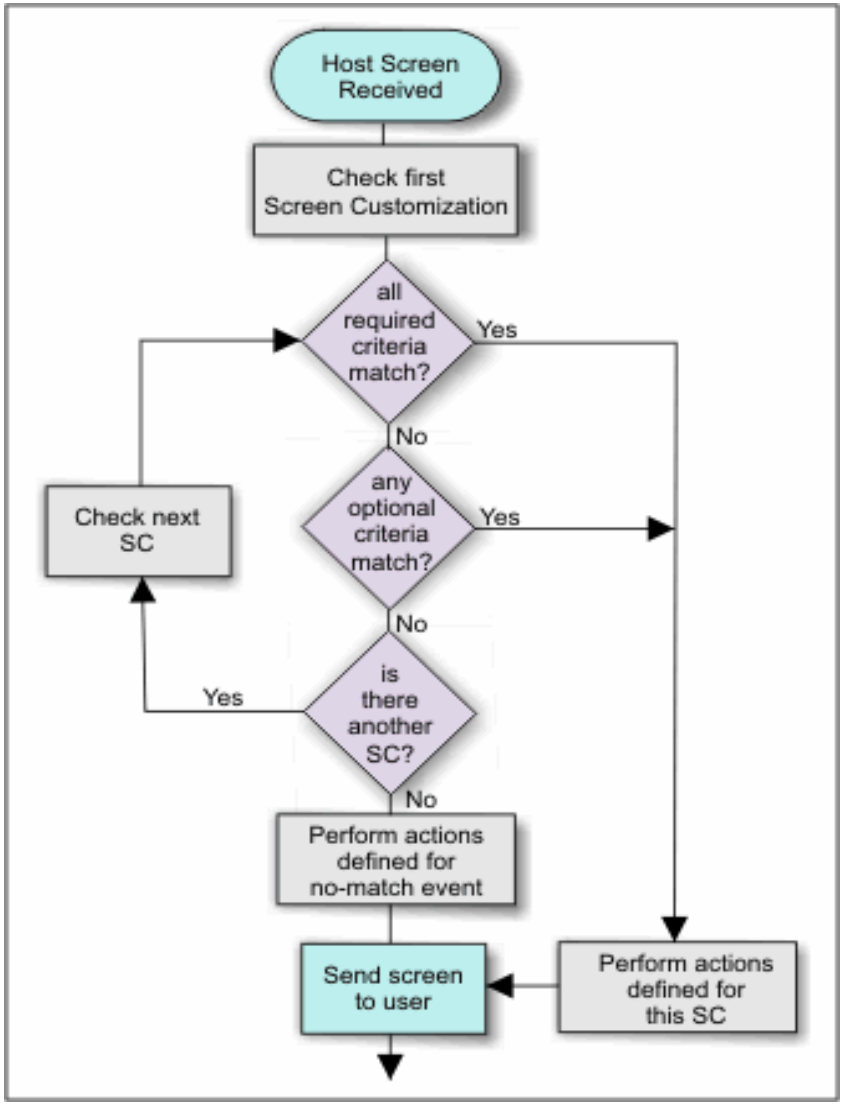
GotheDistance

WebSphere Based Architecture

- WebSphere Studio
  - HATS Studio is a plug-in to WebSphere Studio
    - Wizard-based
    - No programming skills required
- WebSphere Application Server
  - HATS leverages WebSphere Application Server (WAS) at runtime
    - HATS Studio creates a .ear file that is deployed to WAS
- WebSphere Portal Server
  - HATS portlet can be used 'out of the box' with WebSphere Portal Server
  - HATS customization capabilities are ideal for use in portal environment
    - HATS can reduce the amount of information displayed from a host screen, showing only selected data
- WebSphere Host Publisher
  - HATS can integrate with Host Publisher Integration Objects

GotheDistance

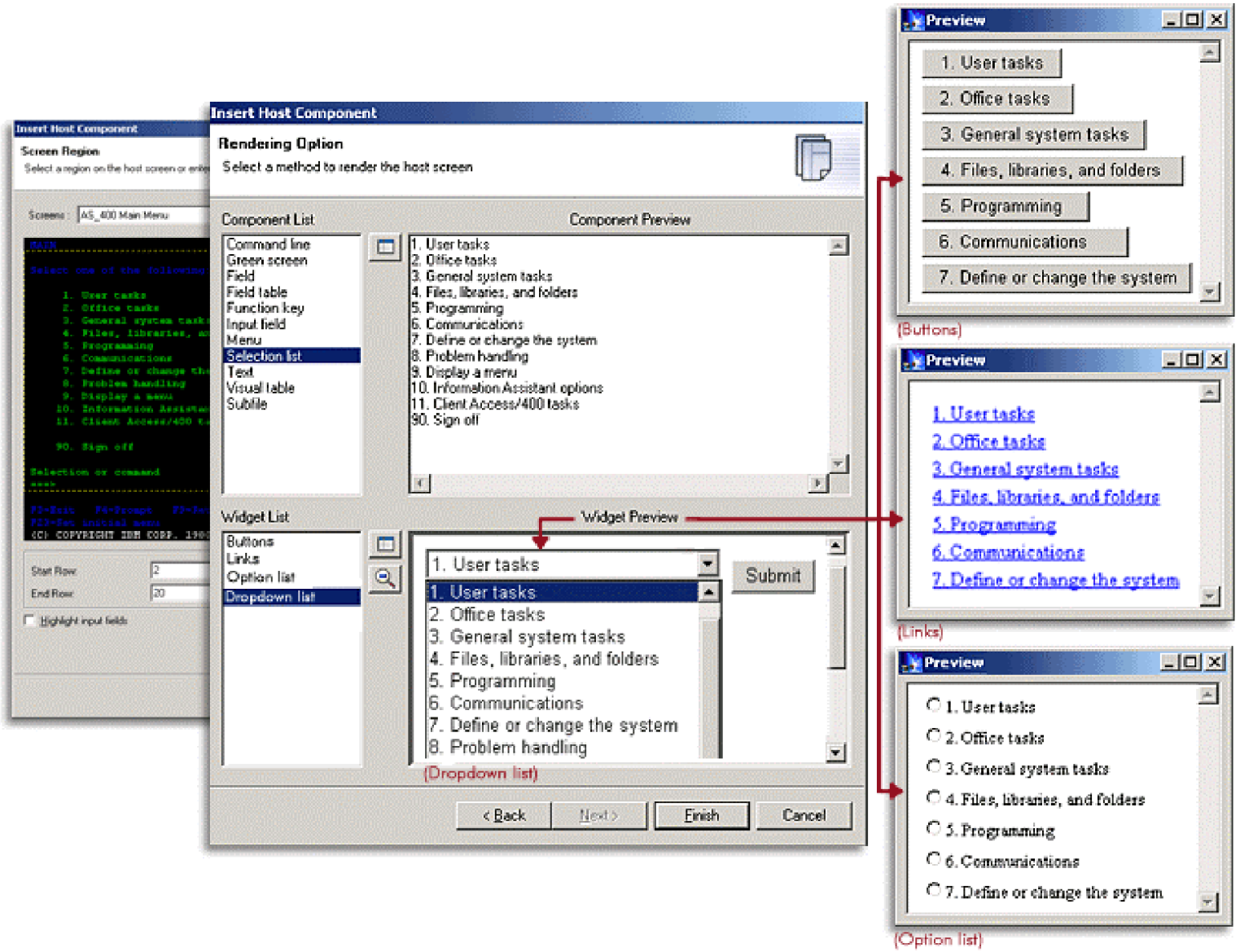
Screen Customization Flow



Sirius Computer Solutions Confidential

GotheDistance

Defining a Rule



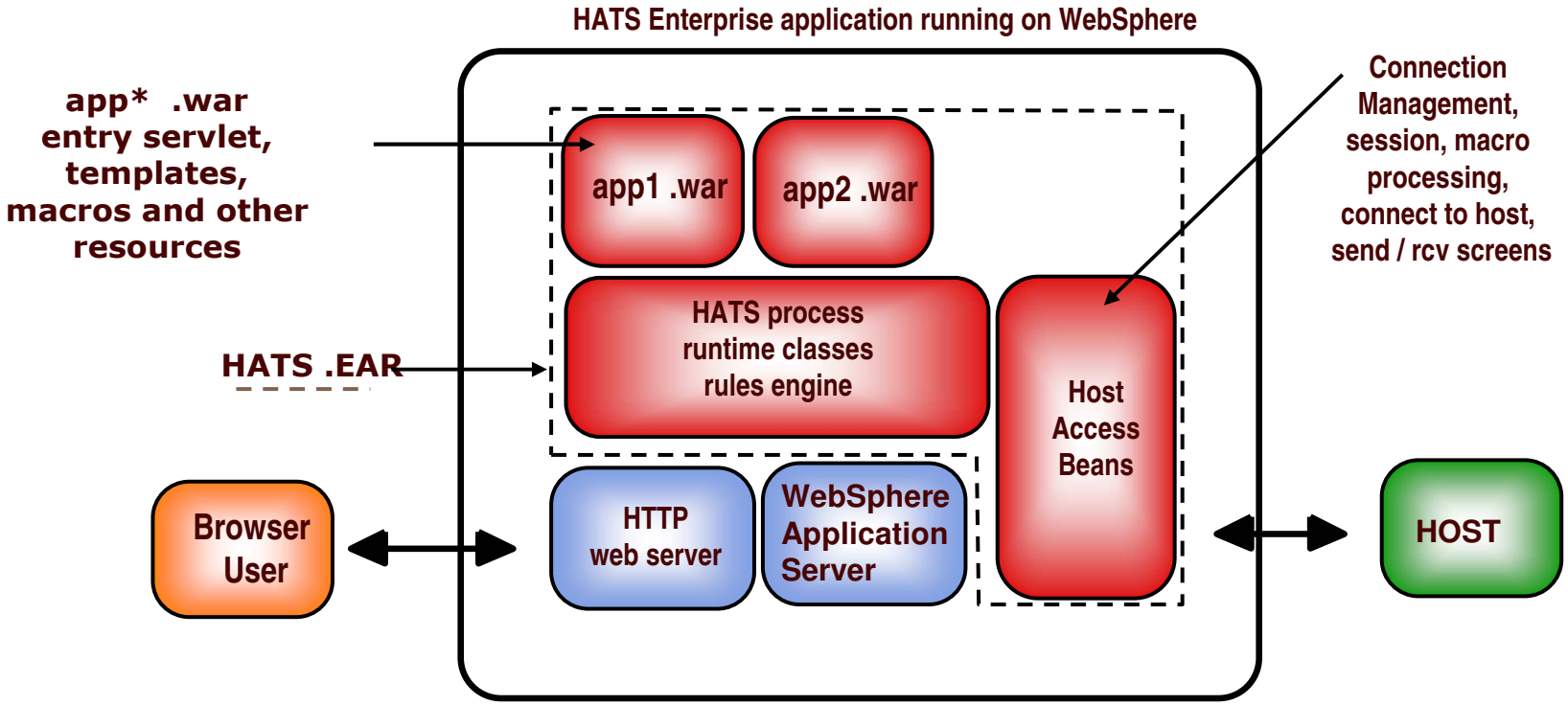
Defining Your Own Rule Sets

- HATS Studio provides easy-to-use wizards for customizing how host components are displayed
- Use WebSphere Studio or any industry-standard HTML editor to add:
  - logos
  - graphics
  - backgrounds
  - Web links and other HTML elements
- Customizations are saved as reusable rule sets that can be applied to any host screens that share similar requirements
- HATS can apply:
  - an individual rule set to each host application
  - different rules sets to a single host application for different end user communities
  - the same rule set to multiple host applications

Sirius Computer Solutions Confidential

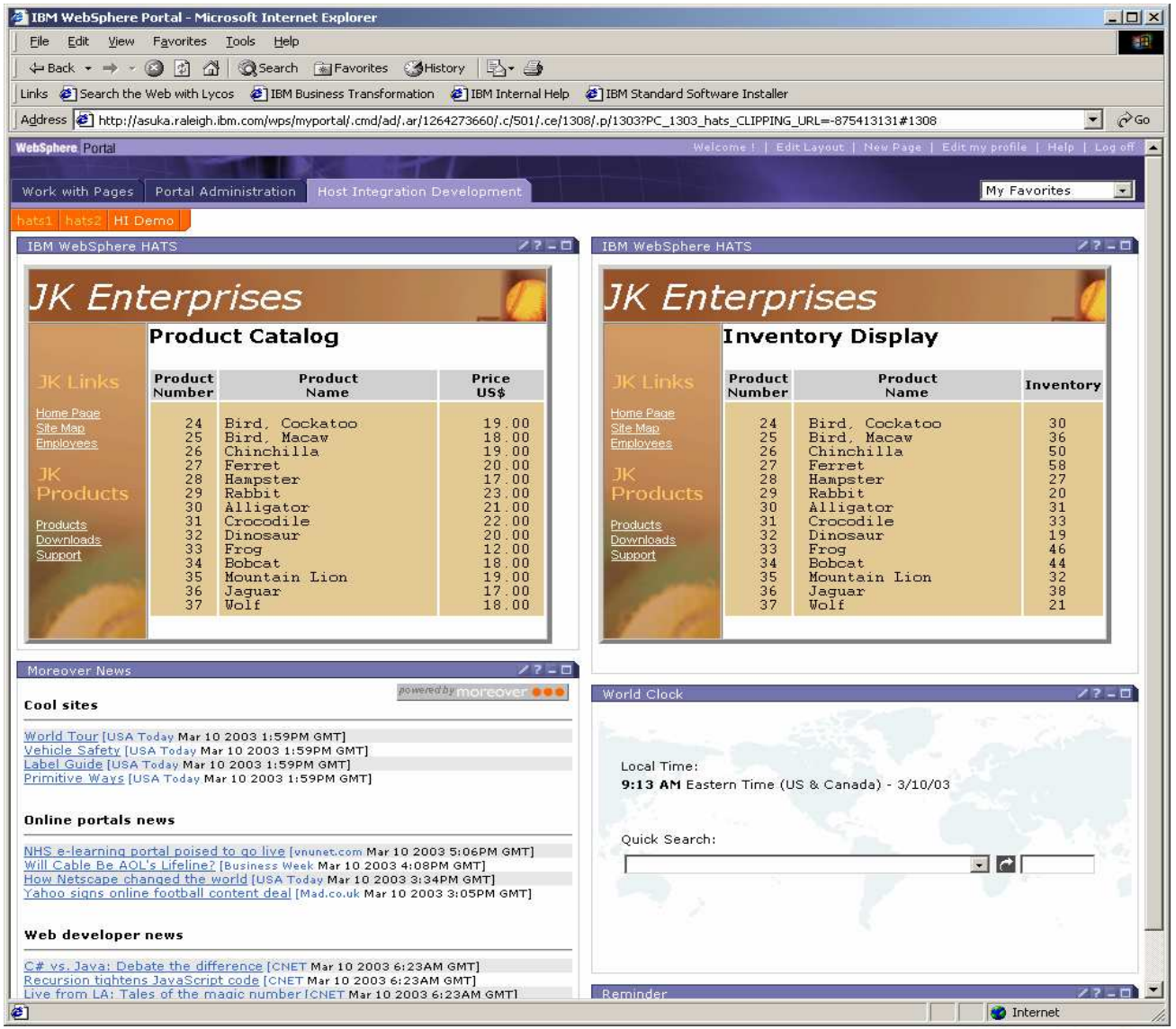
GotheDistance

HATS.EAR Application - Runs on WebSphere



HATS Integration with WebSphere Portal

- HATS provides a portlet for use with WebSphere Portal
- HATS screens can be customized to reduce the amount of data displayed
- Host portlets can be integrated with portlets from other sources



Sirius Computer Solutions Confidential

HATS DEMO

IBM Java ToolBox

The **IBM Toolbox for Java** is a library of Java classes that give Java programs easy access to iSeries or AS/400 data and resources.

JTOpen is the open source version of Toolbox for Java.

GotheDistance

A few of the many OS/400 resources you can access using the ToolBox or JTOpen:

- Database -- JDBC (SQL) and record-level access (DDM)
- Integrated File System
- Program calls
- Commands
- Data queues
- Data areas
- Print/spool resources
- Product and PTF information
- Jobs and job logs
- Messages, message queues, message files
- Users and groups
- User spaces
- System values
- System status

GotheDistance

Java ToolBox Classes

- **Access Classes** enable you to access and manage resources on your iSeries
- **HTML Classes** allow you to quickly create HTML forms and tables
- **Micro Classes** enable you to create Java programs that give your wireless devices direct access to iSeries server data and services
- **ReportWriter Classes** allow you to create formatted documents from XML data sources
- **Resource Classes** use a common framework to access and manage iSeries resources
- **Security Classes** make secured connections with the server and verify the identity of a user working on the iSeries system
- **Servlet Classes** assist in retrieving and formatting data for use in Java servlets
- **Utility Classes** enable you to do administrative tasks, such as using the AS400ToolboxInstaller class and AS400JarMaker class
- **Vaccess Classes** allow you to visually present and manipulate data

Sirius Computer Solutions Confidential

GotheDistance

Example

```
import com.ibm.as400.access.*;

public class CmdCall{
  public static void main(String[] args)  {
try     {
        AS400 system  = new AS400();
        CommandCall cc = new CommandCall(system);
        cc.run("CRTLIB MYLIB");
        AS400Message[] ml = cc.getMessageList();

        for (int i=0; i<ml.length; i++)  {
          System.out.println(ml[i].getText());
        }
      } catch (Exception e){
        e.printStackTrace();
      }
      System.exit(0);
  }
}
```


GotheDistance

PCML DEMO

GotheDistance

Comparisons

Sirius Computer Solutions Confidential

HATS vs HATS LE

Function	HATS	HATS LE
On-the-fly rules-based conversion of host screens to HTML GUIs	Yes	Yes
No need to access or modify source code	Yes	Yes
Host applications can be deployed to the Web within hours	Yes	Yes
Does not require modification when changes are made to host applications	Yes	Yes
Zero-footprint, zero-download - only code needed on the client is a Web browser	Yes	Yes
Supports iSeries subfiles	Yes	Yes
Provides native keyboard support	Yes	Yes
Secure HTTP (HTTPs) and Secure Socket Layer (SSL) security	Yes	Yes
Runs with WebSphere Application Server V4 & V5, including V5 Express	Yes	Yes
Leverages reliability and scalability of WebSphere Application Server	Yes	Yes
Works with Internet Explorer and Netscape Web browsers	Yes	Yes
Supports 5250 hosts	Yes	Yes
Supports 3270 hosts	Yes	No
Requires a WebSphere Studio installed on PC (either V4 or V5) to customize HTML	Yes	No
Uses Web-based Configurator and Management tool to customize HTML	No	Yes
Runs on iSeries Server Platform	Yes	Yes
Runs on AIX, Windows, Solaris, and zSeries Server Platforms	Yes	No

GotheDistance

HATS vs HATS LE

Function	HATS	HATS LE
Any individual screen can be fully customized	Yes	No
Generate and run macros	Yes	No
Skip and combine screens	Yes	No
Store & retrieve data in global variables	Yes	No
Enter data on behalf of end user	Yes	No
Convert text entry fields to valid value lists	Yes	No
Create tabbed folders (with easy to use wizards)	Yes	No
Create bar & line graphs (with easy to use wizards)	Yes	No
Redirect users to other URLs	Yes	No
Globally replace text	Yes	No
Add business logic	Yes	No
Print locally with PDF printing function	Yes	No (1)
Use HATS portlet to integrate with WebSphere Portal	Yes	No

HATS and WebFacing

- If no DDS source code for their applications then HATS is the clear choice
- If there is a WebSphere Portal opportunity, HATS is the clear choice
- If there is need of graph support to supplement the applications, then HATS is a clear choice
- If the environment is mixed iSeries/zSeries, then HATS is the clear choice
- If Netscape support is needed, HATS is a clear choice
- If the customer wants to browser-enable both the application screens (which they may have source for) and the systems screens and menus (which they do not have the source for) then HATS would be a better choice
- If the customer wants scripted navigation through the application, then HATS is the clear choice

GotheDistance

HATS and WebFacing

- If rules-based conversion is attractive to the customer, HATS is the choice
- HATS does provide easier implementation of radio buttons, drop down list boxes and other items most customers associate with a Windows desktop
- HATS has better print support than WebFacing
- Upsell HATS LE into HATS full server by selling Host Integration Solution. iSeries Access is purchased by about 90% of iSeries customers.

GotheDistance

HOD – HATS – Host Pub

Host On- Demand	Hats	Host Publisher
Green screen	Transform screens to html	Present any sequence of screens as a single interaction
3270,5205,VT	3270,5250	3270,5250, VT
TCP/IP connection	TCP/IP connection	TCP/IP connection
No integrated development tools	Integration with Web development environment	Standalone development tools
Single Application focus but can use customer logic to integrate other applications	Single applications focus but can use customer logic to integrate other applications	Easy integration of multiple applications
Wide variety of server and client platforms	Windows, solaris, AIX, iSeries, OS/390	Windows, solaris, AIX, iSeries, OS/390
General purpose emulator, host directed print to direct and local printers	General purpose emulator with HTML transformation , host directed print for textual documents to PDF files on server	Encapsulation of host conversations into single interaction , no printing support.
Pre-built Java applet	Creates deployable J2EE applications	Creates J2EE deployable applications
Direct presentation of host screens	Automatic, on-the-fly ,conversion of all screens to HTML. Zero development effort.	Not a one-to-one screen refacing. No automatic screen conversion capability

Sirius Computer Solutions Confidential

Web Facing	Host Emulator	HATS
Transform only 5250 screens with DDS source files	Present any sequence of 3270, 5250, or VT screens as a single interaction screen	Transform any 3270 or 5250 screen
Must have access to source DDS files	No access to host source files needed	No access to host source files needed
Extensible styles of presentation: Graphics, fonts, colors, layouts	Extensible styles of presentation: Graphics, fonts, colors, layouts	Extensible styles of presentation: Graphics, fonts, colors, layouts
Integrated with WebSphere Development Studio for iSeries	Standalone development tool	Integrates will all versions of WebSphere Studio development environments.
Single application access only	Easy integration of multiple applications	Single application focus put can use custom logic to integrate other applications
No conversion of 5250 data stream to HTML required, direct HTML generation	Generates application generates 5250 data stream and Host Emulator parses HTML for input and output	Generates application generates 5250 data stream and HATS transforms to HTML
Visual guided development with editors for advanced features	Visual guided development and must switch to other tools for advanced use	Visual guided development
Creates deployable J2EE applications	Creates deployable J2EE applications	Creates deployable J2EE applications
Does not require interactive mode. Intercept screens before they are converted to 5250 format.	Requires interactive mode.	Requires interactive mode on iSeries.
Assisted conversion of all screens where DDS source is available.	Not a one-to-one screen referring. No automatic screen conversion capacity.	Automatic, on-the-fly, conversion of all screens. Advanced customization possible if desired.
No emulation capabilities.	No emulation capabilities.	Entry level HTML 5250 and 3270 emulator
No WebSphere Portal support	Can run in WebSphere Portal	Can run in WebSphere Portal

Host Publisher vs WebFacing

Host Publisher	WebFacing
– Part of iSeries Access Family, 5722-XW1	– Part of WebSphere Development Studio for iSeries, 5722-WDS
Data source can be: – 5250, 3270, DEC/UNIX application – Host system screens – Database requests (JDBC) – Other Java host applications	Data source is: – 5250 application
– Don't need source code	– Need DSPF DDS source code
– Users can be given access to only some of the application's screens (5250 program runs 'as is') but, can reduce complexity of interacting with application and improve end user productivity	– Fast path to globally convert application -- one-for-one conversion of application screens (5250 program runs 'as is') -- users will see all application screens -- good way to provide browser access to interactive applications
– Multiple data sources can be combined into a single application to create a composite application. Creates Integration Objects and reusable Java beans and JSPs -- can output data from one Integration Object as input to another.	
Runs in any browser supported by WAS – Internet Explorer, Netscape...	– Runs in Internet Explorer

All Four

Feature	HATS LE	HATS	Web facing	iAW
Customizable GUI	min.	YES	YES	min.
Requires app. DDS	NO	NO	YES	NO
Requires Modification when changes are made DDS.	NO	NO	YES	NO
Development effort required	NO	NO	YES	NO
Skip host screens	NO	YES	NO	NO
Combine host screens	NO	YES	NO	NO
Save data into global variables	NO	YES	NO	NO
Create tabbed folders	NO	YES	NO	NO
Generate bar and line graphs	NO	YES	NO	NO
Add business logic	NO	YES	NO	NO
Portal Enabled (*)	NO	YES	NO	NO
Host Keyboard support	YES	YES	YES	YES

Feature	iSeries Access for Web	WebSphere Host Publisher	WebFacing	Host On-Demand	Screen Customizer
iSeries Session	Batch	Interactive	Interactive	Interactive	Interactive
Client requirements	HTML browser	HTML browser	JavaScript enabled browser	Java enabled browser	HOD or PCOM
Communications protocol	HTTP	HTTP	HTTP	TN5250	TN5250
Requires WebSphere Application Server	yes	yes	yes	no	no
Requires development effort	no	yes	yes	no, other than SQL tasks	yes
Customizable GUI	yes	yes	yes	minimal	yes
Printer emulation	no	no	no	yes	no
Client printing	browser print	browser print	browser print	screen print	screen print
PC File upload	yes	no	no	yes	no
Database access	yes	yes	via WebSphere Studio, etc.	yes	via user written applet
Security	SSL based HTTP	SSL based HTTP	SSL based HTTP	SSL based TN5250	SSL based TN5250
Licensing	Concurrent (1) or Processor-Based	Concurrent (1) or Processor-Based	Processor-Based (3)	Concurrent, Per Copy (2)	Concurrent, Per Copy (2)

GotheDistance

Summery

- iSeries Access for the Web
  - Functionality through a browser
- Host on Demand
  - Green Screen in an applet
- Host Publisher
  - macros
- WebFacing
  - One to one conversions
- HATS LE
  - On-the-fly mini HATS
- HATS
  - Long term customization
- Java ToolBox
  - Complete customization

GotheDistance