

COCKPIT[™]
Enterprise, Server-based Computing

www.jetroplatforms.com

Jetro Cockpit Enterprise Version 3.6

White Paper

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Jetro Platforms is a leading enterprise software developer of server-based computing solutions.

Jetro Platforms' solutions enable rapid and easy deployment, as well as simplified integration into existing network environments and provide a simple way to slash costs of enterprise IT, improve security, provide remote access, and ensure business continuity.

The company's Jetro COCKPIT™ product family offers a comprehensive set of features, including multi-protocol support for work in mixed environments (ICA®, RDP®, HTTP and local), comprehensive Load Balancing, Secure Remote Access, an Advanced Printing Solution, Monitoring, Reporting, and a Seamless User Experience.

Jetro Cockpit™ is available worldwide exclusively through a network of expert server-based computing solution providers.



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Abstract

This paper explains Cockpit™, the flagship product of Jetro Platforms. The following topics will be discussed in this paper:

- INA™, the technology that enables Jetro Cockpit to deliver peak network performance, maximum usability and reduce network total cost of ownership
- Cockpit's load balancing scheme
- The components of a Cockpit administered network

This document is intended for IT professionals and managers.

Introduction

Cockpit is a server-based computing platform and management system for application and content delivery. It allows system administrators to oversee an entire server-based network including local, web-based and server-based applications.

Several features make Cockpit unique in the marketplace. Cockpit is the only system available that allows an organization to deliver local applications through the same delivery platform as server-based computing applications. Cockpit is the only network platform that offers Integrated Network Architecture (INA), a computing paradigm that treats management rules and network components as independent objects that can be configured independently and easily associated and re-associated with any other object. INA will be discussed in greater detail later in this paper.

This paper will explain INA, the Cockpit user interface, Cockpit's load balancing scheme, the devices that make up a Cockpit network and the way that these devices communicate with one and other.

Integrated Network Architecture

To understand Cockpit, one must first understand Integrated Network Architecture (INA), the heart of Jetro Platforms technology. INA is a network management paradigm that treats the following as independent objects:

- Clients
 - Users
 - Workstations
 - User groups
 - User profiles

- Business rules
 - Schedules
 - Permissions
 - Security policies
 - Connection policies

- Resources
 - Servers
 - Applications
 - Application groups
 - Domains

Objects are defined independently, but can be associated with other objects using a simple graphic interface.

Benefits of INA

- **Management of Mixed Environments.** INA allows an organization to move gradually to a server-based computing environment. Jetro's products can deliver and manage material and applications from local PCs as easily as they deliver server-based applications. INA enables Jetro products to manage centrally the following types of applications and information:
 - **Server-based computing.** Servers in a CockpitIT environment can deliver content and applications in RDP or ICA transfer protocols.
 - **HTTP.** Users can access Web and intranet-based material through their server-based computing portal.
 - **Local applications.** Even applications on users local computers can be managed and tracked by the CockpitIT Server.
- **Convenience.** INA gives administrators a Web-based graphic interface to manage and monitor applications, workstations, users, and other network resources. The interface was designed to be user friendly and give administrators maximum control over the computing environment.
- **Faster Application Deployment.** INA's modular design allows administrators to re-use schemes for formatting, preferences and configuration. A single configuration scheme can be associated with dozens of applications or hundreds of users and user groups. This saves time and reduces opportunities for error.
- **Panoramic Reporting.** Because INA lets administrators manage applications from the Web and local computers, they can monitor usage of local, web and server-based applications. CockpitIT reports can be analyzed in Microsoft Excel, most database programs, and most billing systems.

Configuration Tools

The following is a list of tools that INA makes possible:

- **Security Configuration.** INA allows you to create modular lists of users and groups to permit or prohibit from accessing an application. Each list, called a security policy, can be re-used and associated with any application. Security policies are defined as allow or restrict. A restrict policy prohibits selected users and groups from accessing an application. An allow policy gives selected users and groups access to an application.
- **Scheduling.** Administrators can define the times of day and days of the week when an application will be available. Like security policies, schedules are modular and can be re-used and associated with any number of applications.
- **Delivery Configuration.** INA allows an administrator to designate the server and path on which an application will run. Administrators can identify which server will serve which application and how each application will be accessed on that server.

Reporting Tools

INA allows administrators to monitor use of Web, intranet, server-based, and local applications. The following is a list of INA's reporting tools:

- **Effective User Rights.** Administrators can view a list of all of the applications that a user can access just by clicking on the user's name. Administrators do not need to logon with a username to find out what applications a user can access. Similarly, administrators can easily view what users are in a group and the applications that every group member can access.
- **Real-Time Monitoring.** View all of the activity on all of the servers, including usernames, applications, servers and more. This information can be queried by server, application or username.
- **Reporting.** An event is recorded by the reporting service every time that a user requests a session from the Cockpit Server. Events are saved in XML format so that the administrator can view and query this data. Queries can be exported as comma separated text files (CSVs) and can be viewed with most database programs, billing systems, and Microsoft Excel.

INA gives Cockpit flexibility and makes network configuration fast and convenient.

CockpIT System Overview

The CockpIT system can be divided into three distinct elements:

- A management server (the CockpIT server)
- A reporting and service agent called a Terminal Server Agent (TS Agent)
- A client plug-in

This section describes each of these elements in detail.

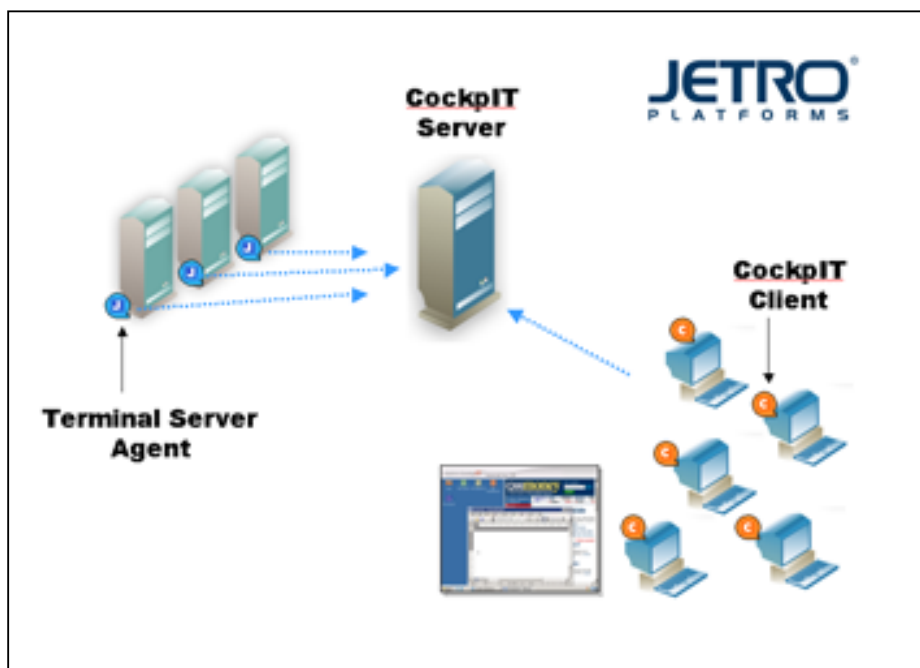


Figure 1. Components of the Jetro CockpIT Solution

CockpIT Server

The CockpIT Server manages and monitors application and content delivery as well as the relationships between all elements in the server-based computing network. It is a server running Windows 2000 or Windows Server 2003 installed with Internet Information Server (IIS). It is worth noting that CockpIT is .NET server-ready. The following is a partial list of the features of the CockpIT Server.

- **XML Engine.** The CockpIT Server reads and writes data in XML. The system logs, configuration data, and server communications are all in XML format.
- **Directory Services Connectivity (DS Connector).** CockpIT communicates with the network directory service server to authenticate users when they log on.

- **Scheduling.** Administrators can define when users should be able to access particular programs and when certain programs should be inaccessible.
- **Security Management.** Security policies are an easy way for administrators to define which users can access which applications. Once a policy is created, it can be reused to give the same users and groups access to any number of other applications or application groups.
- **Load Balancing.** CockpIT balances workloads across the server farm based on an administrator-defined load balancing algorithm. For more information about CockpIT's load balancing feature, see the load balancing section later in this document.
- **Publishing the CockpIT Virtual Desktop.** CockpIT uses administrator-defined security policies to customize a virtual desktop for every user in the directory service. CockpIT Virtual Desktops contain folders and links to applications and information from Citrix Servers, Microsoft Terminal Servers, intranet, Internet, and users' local computers. Links lie on the user's desktop or are organized into folders on the user's desktop.
- **Server Status Monitoring.** Terminal servers send the CockpIT Server updates about their load and availability. Administrators configure how frequently these updates occur. Administrators also configure how many times a server can fail to update the CockpIT Server before CockpIT will declare that server off-line.
- **Terminal Server Failure Alert.** Administrators can input a customized command line that will go into effect when a terminal server goes off-line. For example, an administrator can input a command line that sends a pop-up message, e-mail, or SMS message when a server goes off-line.
- **Server Load Monitoring.** The CockpIT Administrator Console displays information about every server in real time. The following information is displayed in the CockpIT administrator console:
 - *Server status* (on-line, off-line, or disabled)
 - *Calculated load degree*
 - *Names of all counters for all servers*
 - *Counter values* (displayed in real-time)
- **Defining User Profiles.** The administrator uses a simple graphic interface to define sets of user parameters like local disk drive mapping, ThinPrint™ enabling, and whether the user connects to the network with internal IP addresses, NAT, or DNS names. A set of parameters is called a user profile. Every user profile can be associated with any security policy (list of user and groups). A single user can be assigned more than one user profile. In such a case, the user would choose his own user profile from a drop down menu.

Jetro Client

CockpitIT users download an ActiveX plug-in that allows them to access server-based, web-based, and local applications through the CockpitIT Virtual Desktop or Jetro Direct Link. The plug-in is less than a megabyte in size and installs automatically the first time a user logs into the CockpitIT system.

Seamless RDP

Seamless RDP makes server-based computing applications look, feel, and perform like locally installed applications.

- Applications appear without an RDP frame
- Users can maximize, minimize, or resize applications
- Users can move application session windows just like they click and drag windows for local applications
- When a new application is launched from inside of an existing application window, an application button will appear on the user's task bar.
For example, if a user received a Microsoft Word file during a server-based session of Microsoft Outlook, a button for Word would appear in the user's local task bar when the user opens the Word file.

RDP 5.2 and Windows 2003

Jetro CockpitIT leverages the new capabilities of RDP 5.2 in MS Windows 2003. New features like full color support and local disk drive mapping bring new power to enterprises who use RDP in their server-based computing environment. The following is a partial list of the new features of RDP 5.2 in Windows 2003:

- True Color (up to 24 bit)
- Full Stereo Sound
- Local Disk Drive Mapping

Jetro Direct Link

Users can access applications and content directly from a windows desktop, from the Windows Start menu or from a link in the Windows System Tray. With Jetro Direct Link, users can access individual applications just by clicking an icon on their Windows Start menu. Users can call up a CockpIT Virtual Desktop by clicking on the Jetro Sphere in the system tray.

CockpIT-administrated applications are as easy to use as applications activated from a user's local computer. Links on the user's Windows desktop relate information to the CockpIT Server. This information includes a code for the requested program as well as the username and password of that user. After users download Jetro Client for the first time, they no longer need to log-in to CockpIT. They can access application from the Windows Start menu just like they access applications from their local computers.



Figure 2. Links to CockpIT-managed applications in the start menu

When a user logs into a CockpIT Virtual Desktop from the Internet, the Jetro Client plug-in will automatically download to the user's workstation. The Jetro Sphere will appear in the System Tray and there will be a folder for CockpIT Applications in the Start menu.

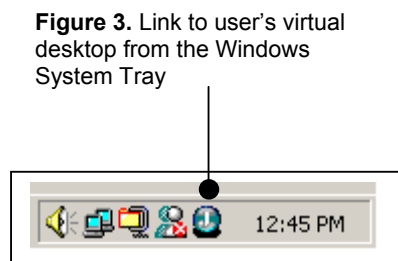


Figure 3. Link to user's virtual desktop from the Windows System Tray

Terminal Server Agent (TS Agent)

The Cockpit Server communicates with application and content delivery servers via a software element called a Terminal Server Agent (TS Agent). Every server has a TS Agent. The TS Agent examines the server's load and sends updates to the Cockpit Server. Load balancing information from the TS Agent is processed in a customized algorithm (see the section in this document about load balancing).

Cockpit also uses TS Agents to detect server failure. If Cockpit does not receive an update from a server's TS Agent for a predefined timeout period, Cockpit will take that server off line and redirect application requests to another server.

TS Agents are installed and configured using a wizard from the Cockpit Administrator Console. It is worth noting that installation and configuration of a TS Agent generally takes about five minutes.

CockpIT's Load Balancing Scheme

CockpIT's load balancing is based on an adaptable algorithm that uses counter factors to determine load degree. Counter factors are included in the Windows 2000 Server and Windows Server 2003 and can be used to monitor a broad range of server activity including CPU usage, free memory etc. Load degree is determined through an algorithm that includes the administrator-determined counter factors for that server.

The administrator chooses and prioritizes counter factors for every server using a program called JDsSlpGenerator. This program was designed by Jetro Platforms to allow administrators to take advantage of the performance monitoring counters that were defined by Microsoft in Terminal Server.

A load balancing policy consists of a list of counters with administrator-defined weights assigned to each counter. Every server is assigned a different load balancing policy. For example, a server farm that has five servers to deliver MS Office applications and five servers to deliver ERP or CRM applications may have different load balancing policies for the ERP and the MS Office servers. The MS Office servers might have counters that investigate CPU and memory usage. Because ERP terminal servers require less CPU, it probably would not be worthwhile to include CPU in the ERP terminal server's load balancing policy.

Alternatively, CPU may be a counter on the ERP and the MS Office servers, but the weight for the CPU counter may be significantly higher on the MS Office server because CPU usage is such a large factor in determining the availability of the server to deliver an office application. CockpIT's load balancing scheme maximizes system performance by giving administrators flexibility in how they define the availability of their servers.

The load degree of a server is also affected by something called a server factor. The server factor is a constant that can be added or subtracted from a server's total load degree. Two servers with the same counters and the same amount of usage can have vastly different final load degrees if they have different server factors. If a server has a server factor of ten, for example, its final load degree will be increased by ten regardless of the load degree calculated based on the counters in its load balancing policy. Server factors and counters are just a few examples of the tools in CockpIT that allow the administrator to customize the load balancing of the server farm.

CockpIT load balances servers on an application-by-application basis. Every time a user requests an application, CockpIT chooses the server with the lowest load degree to deliver it. Multiple servers can deliver multiple applications to the same user. This allows CockpIT to deliver applications from the most available server every time that a user requests a new application.

The CockpIT Printing Solution

The Jetro CockpIT™ printing solution combines universal printer driver technology with a new concept called “Virtual Printer.” The following is a partial list of the benefits that CockpIT printing makes possible:

- PostScript (PDF) spooling
- Print job compression
- Zero printer administration
- Remote control of printer settings
- Color depth control
- Resolution depth control
- Paper orientation and size control
- Support for locally attached USB printers
- Support for legacy printer drivers

CockpIT printing elements are installed in the CockpIT Server, terminal servers, and in every user workstation. When a user prints from a CockpIT-managed application the print job is converted to PDF, compressed and then sent to a service on the CockpIT Server called the CockpIT Print Manager. The CockpIT Client software on the user’s workstation scans the CockpIT Print Manager for new print jobs that belong to this user. When it finds a print job, it will download it and the user will see the following image:

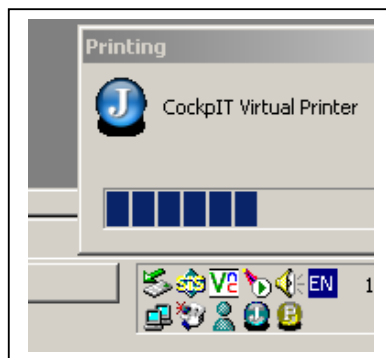


Figure 4. The CockpIT Virtual Printer print progress screen.

After the print job has been downloaded to the user’s computer, the user prints from the user’s local workstation using Adobe Acrobat Reader. This gives the user maximum control over printing settings like color depth, page orientation, and page size.

Entity List

A server farm administrated by a Cockpit Server contains at least one Cockpit Server, any number of terminal servers, client workstations, directory services, and back office servers. The server farm may also include a firewall and remote users. Every client workstation uses a copy of Jetro Client and every terminal server is installed with a TS Agent. The following is an explanation of all of the components of this server farm.

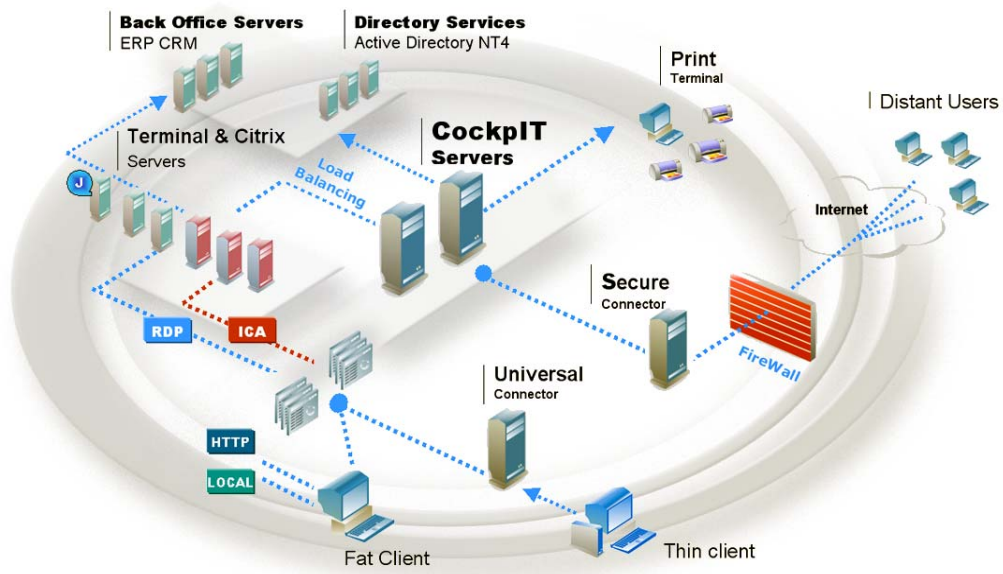


Figure 5. Components of a CockpitIT-administrated server-based computing network

- **Cockpit Server.** CockpitIT will only deliver applications using the RDP transfer protocol, be sold to enterprises with active Citrix licenses. The CockpitIT/BoostIT Server is a server installed with Windows 2000 Server or Windows Server 2003 and installed with Internet Information Server (IIS). It is worth noting that both CockpitIT and BoostIT are .NET ready and can be installed on a .NET server as easily as on a Windows 2000 server.
- **Terminal Servers.** In a CockpitIT environment, these are Microsoft Terminal Servers. In a BoostIT environment, these are Microsoft Terminal Servers and Citrix Servers. The following are some examples of applications that might be installed on these servers: Microsoft Office, mail clients, the client side of an ERP or CRM applications. These servers should be configured to authenticate users against the selected directory service. A Jetro TS Agent is installed in each of these servers but not on the directory service.

- **Client Workstations.** Client workstations are the end-user's interface with the server farm. Workstations can be thin clients or conventional (fat) PCs. When a user logs onto Cockpit for the first time, an ActiveX plug-in called Jetro Client will download to the user's workstation. Jetro Client can access the Cockpit Server from the LAN, WAN, Internet, or via remote access.

Cockpit delivers a customized user desktop to every user. Every user's desktop is based on the policy database that the administrator defined in the Cockpit Administrator Site.

Once a user logs onto Cockpit for the first time, applications can be accessed through icons in the Cockpit folder in the Start menu or through a Cockpit Virtual Desktop. Users can access their virtual desktops through a link in the Windows System Tray. All of the user's links are synchronized with the administrator-defined rights that are recorded in the directory service and in Cockpit scheduling and security policies.

- **Directory Services.** This server stores the user list database. The directory service can be Active Directory, NT4 Domain, or a local host. There is no Cockpit component installed on this server.
- **Back Office Server.** This server houses the server side applications from the Cockpit administrated farm. There are no Cockpit components installed on these servers. Mail server and database server are examples of programs that reside on these servers.

Relationships Between Entities in the Cockpit Administrated Server Farm

1. Client to Cockpit Server

- **Connection.** Clients connect to the Cockpit Server through a web browser. Users can access applications by clicking on icons in their Cockpit Virtual Desktops or icons in the Windows Start Menu. They can access these virtual desktops by clicking on an icon in the Windows System Tray or by directing a web browser to the Cockpit user page on the Cockpit Server.
- **Downloading.** An ActiveX plug-in (Jetro Client) downloads to the client workstation the first time a user logs onto Cockpit. This plug-in will automatically be updated whenever the client software is updated.
- **Application Request.** When a user clicks on an icon, the scheduler service checks the application's availability against the server clock. If the application has been designated available for that time period, Cockpit delivers the name of the most available server and the appropriate application path. If the icon represents an allowed HTTP link or a local application, the client will execute the link or application locally.
- **Tickets.** When a user logs onto a Cockpit Virtual Desktop, a unique code is generated called a "ticket." A ticket is used to identify and trace the user's actions.

When user leaves the Virtual Desktop idle for too long, he or she will be asked to login to the Cockpit Server again. This is called a "ticket time out." The time period before a ticket time out is defined by the administrator.

2. Cockpit Server to Directory Services

- **User List Update.** When the Cockpit Server starts, it looks for the server that holds the directory service database. This server is called the directory service domain controller. Cockpit generates its own copy of the user list based on the directory service domain controller. This copy of usernames and groups is displayed when the administrator defines security policies. This list refreshed periodically. Refresh frequency is defined by the administrator.
- **Authenticating.** When a user logs onto the Cockpit Server, Cockpit authenticates login information against information in the directory service domain controller.

3. Cockpit Server to Terminal Servers

- **Load Status.** TS Agents on the terminal servers update the Cockpit Server with information about the server's load status. Servers update the Cockpit Server according to an administrator-defined interval.
If a server fails to communicate with the Cockpit Server, Cockpit will designate that server as unavailable and route user requests to other servers. Cockpit will then execute the server-failure script that the administrator defined.

- **Monitoring.** The Cockpit Server queries the terminal servers to build on-line monitoring reports.

4. Jetro Client to the Terminal servers

- **Application Request.** When a user selects an icon from a virtual desktop or from the Windows Start Menu, the Cockpit Server responds with the name of the most available server and the application path that is appropriate for that server. The Jetro Client on the user's workstation will now initiate a communication with the application or content server. The server will verify the request with the Cockpit Server and then deliver the appropriate application or content.
- **Delivery.** Server-based applications are delivered in either the RDP or ICA protocol. Delivery in ICA protocol is only available to enterprises that already own Citrix licenses.

5. Terminal Servers to Back Office Servers

- **Client Server Communications.** Terminal Server Agents, Cockpit Servers do not interact with back office servers at all. The connection between these servers and enterprise terminal servers is part of a regular interaction between the client-side and server-side of each application. This communication is done on the LAN between the local and the terminal server.

Summary

Cockpit is a server-based computing platform that dramatically simplifies server-based computing implementations, server farm management and printing. Cockpit is the only available server platform that allows administrators to centrally manage centrally both server-based and local applications and content. BoostIT allows administrators to centrally manage server-based and local applications and it also allows the administrator to manage a server farm that delivers applications in ICA transfer protocol as well as RDP transfer protocol. Finally, Cockpit is the only available service platform with Integrated Network Architecture (INA), the object oriented systems architecture that makes system configuration easier by treating business rules and network components as interrelated re-usable objects.

Visit the Jetro Platforms website for downloads,
product updates and on-line support.

www.jetroplatforms.com

COCKPIT™

Enterprise, Server-based Computing

Jetro Cockpit™ is a Server-based enterprise suite that manages end-user access, secures data and deploys applications from one or more Microsoft Terminal Servers and/or Citrix Servers. With Cockpit™, system administrators can oversee an entire Server-based Computing environment including local, remote, Web-based and Server-based applications.

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