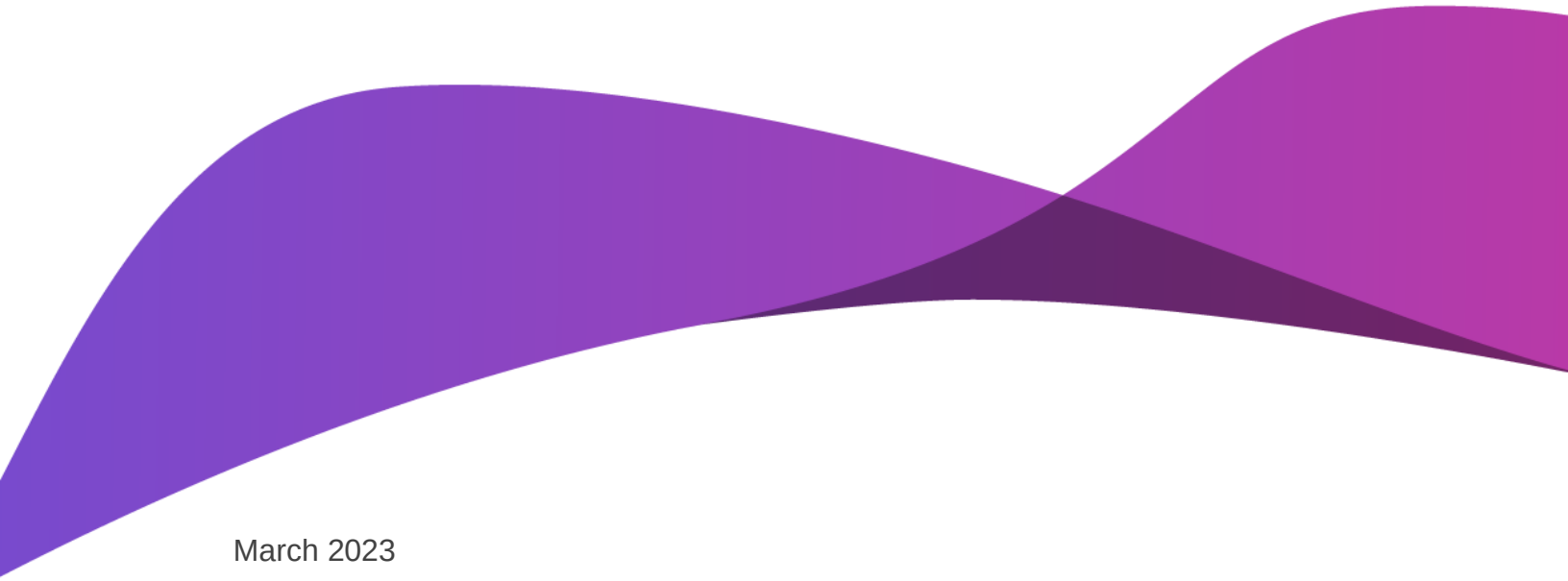
FINASTRA

THE FUTURE OF FINANCE IS OPEN

Phoenix

Systems Infrastructure Design & Standards Guide

for Outsourced Processing Clients



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Overview

This document provides a high-level overview of Phoenix Outsourced Processing Services (OPS) Deployment. Institutions that are in the early phases of evaluating Phoenix may use this guide to understand the architecture and costs that might be incurred during system implementation.

Phoenix is a multi-tiered, .NET Framework-based solution that runs on a SQL Server database system. The system's infrastructure contains several components that are briefly described in this document. The core system securely resides in Azure data centers, and some components are required on-site at the financial institution.

Associated Documents

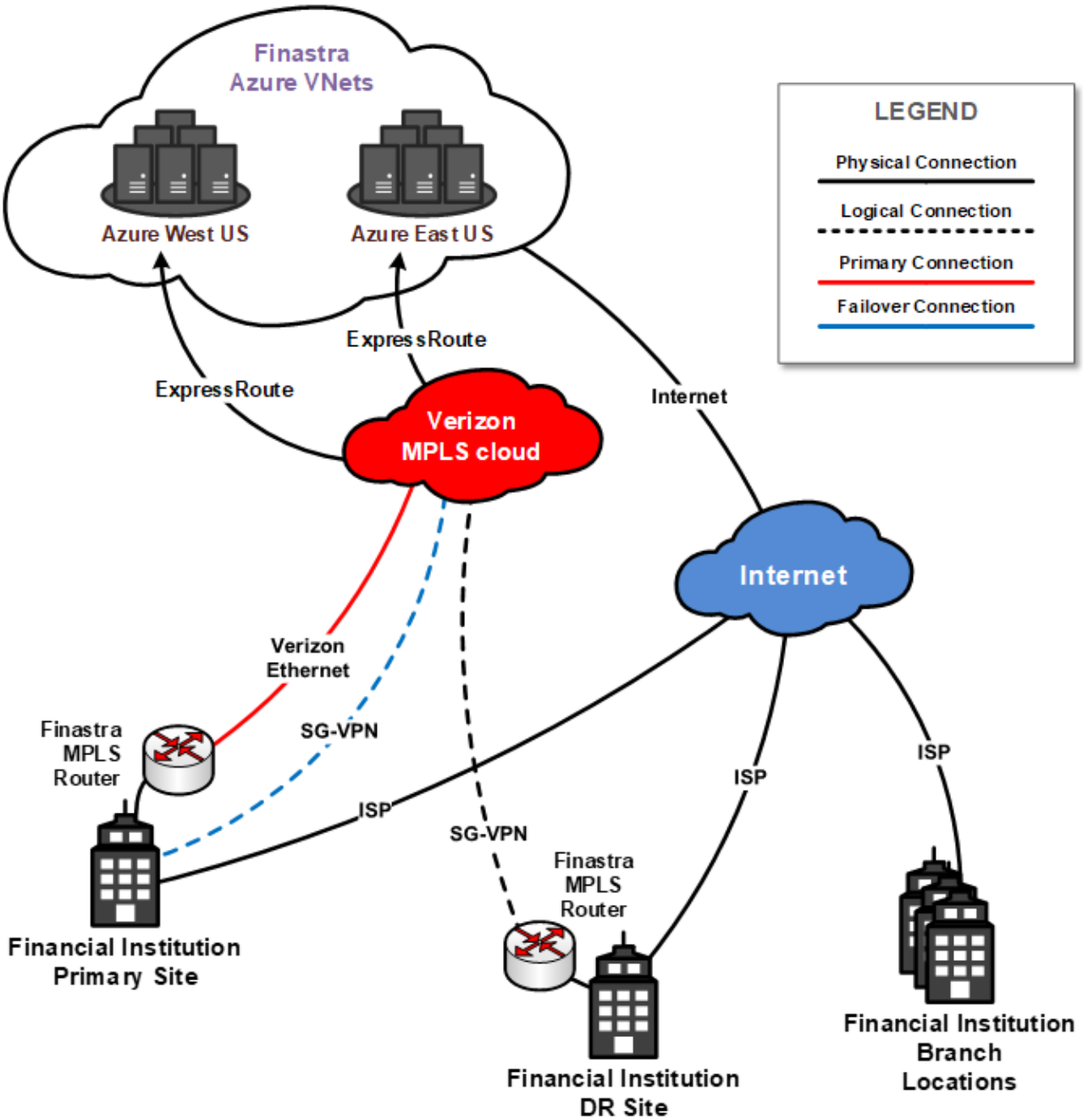
References to other documents may be made throughout this guide. Please contact your Finastra representative to obtain the following documents to supplement this material.

- Phoenix Platform Compatibility Matrix: Supported versions of Database Management Systems (DBMSs), operating systems, and other platforms used by Phoenix
- Nexus Evolution Supported Devices: Device compatibility list
- Compuflex Supported Devices: Compatibility for Teller Cash Recycler (TCR) and Teller Cash Dispenser (TCD) devices

Network Connectivity

Finastra's recommended WAN connectivity for a Phoenix OPS client is a Verizon Ethernet connection into Finastra's global MPLS network, which provides connectivity into Microsoft Azure for Phoenix via an Azure ExpressRoute circuit.

A failover connection is recommended in addition to the MPLS line. This secondary connection utilizes the Financial Institution's Primary Site's Internet connection to carry traffic over a VPN. This secondary connection is called SG-VPN (Secure Gateway Virtual Private Network) and is also provided by Finastra as part of our Verizon global infrastructure.



Wide Area Network (WAN) and MPLS

An MPLS circuit is ordered or leased to establish connectivity between branches and the data centers (Availability Zones) in Azure East or Azure West regions. A Finastra-managed MPLS router is deployed at both your Primary site and Disaster Recovery (DR) site. Your primary Azure region is determined based on your Primary site's proximity to the Azure region. Both sites connect to the primary Azure region unless there is a failover to the secondary Azure region.

At your Primary site, a Verizon Ethernet line is connected to the MPLS router. Network traffic destined for Phoenix is directed through the router, traverses Verizon's MPLS cloud, and connects directly to the primary Azure region, sending data to your Phoenix instance. Network Address Translation (NAT) is used between your local subnet, the MPLS network, and Finastra's VNet environment in Azure.

For local failover, a secondary connection is configured to send data through your internet connection in the event that the Verizon ethernet line is cut. This SG-VPN is a Verizon VPN service that connects into the MPLS network. Failover to this connection is effectively instantaneous and does not incur any downtime to the end-user or financial institution.

A hub-and-spoke network topology is employed for Phoenix network traffic that originates from branch locations. Packets are routed to your Primary site over the financial institution's WAN connection, then sent over Verizon MPLS network to your Phoenix instance in Azure.

Note: If using a third party or cloud provider to host your infrastructure, there are other options available to connect. Please speak with your Finastra representative to explore all options.

Disaster Recovery Failover

Your intuition's DR site also has a Finastra-managed MPLS router. If your Primary site becomes entirely unavailable, such as in the event of a natural disaster or full connectivity outage, a manual failover will be invoked to route all network traffic through the DR site. An SG-VPN connection from the MPLS router supports outgoing Phoenix traffic. Failover takes about 10-15 minutes.

A secondary route is defined to the DR site MPLS router, which is failed over to in the event of a disaster where all connections are lost at the Primary site. The failover route propagates to all branch locations automatically. When your Primary site becomes available again, failback is a manual process.

Bandwidth Requirements

Bandwidth requirements are based on the number of remote workstations running Phoenix and any other applications running over the WAN connection. Please speak with a Finastra Presales Architect if you have more than 200 users at a single site in order to properly architect bandwidth and latency for good performance.

Assembly Server

This section provides a conceptual sample of system architecture. Actual hardware specifications vary for each financial institution based on its specific needs and requirements. The preferred configurations are described below.

While the core database and business logic servers are fully managed by Finastra and reside securely in Azure cloud, some on-site components are required to facilitate communication and upgrades.

The following Windows server will need to be provisioned at the Main Office or Primary Site to support various functions for Phoenix. The server can be physical or virtualized. Assembly servers are not required at branch offices.

The Assembly server supports the following functions:

- Maintain Phoenix assemblies: When Phoenix is updated by Finastra, assemblies are pulled from the Azure cloud to the Assembly server.
- Provide Windows Server file share for System Administration and Nightly Processing.
  - System Administration supports administrative and operational functions of the Financial Institution.
  - Nightly Processing can be used to produce Phoenix core reports ad-hoc during the day, if needed.
- Configure teller receipt printing via Nexus Evolution: Nexus Evolution is the third-party software used for teller receipt printing. Nexus Evolution requires a SQL Server database on the Assembly server to store the teller receipt configuration. SQL Server Express can be deployed for teller receipt printing.

While the above is a typical deployment, there are other options to deploy these components, including:

- System Administration and Nightly Processing may be able to be deployed to your existing File Server.
- The Nexus Evolution database may be able to use your existing Microsoft SQL Server database, instead of installing SQL Server Express on the Assembly server.
- Notify your Finastra representative if you're using a third-party to host your IT infrastructure.

Please contact your Finastra representative to explore all options.

Hardware Requirements

Component	Minimum Requirement
Operating System	Refer to the *Platform Compatibility Matrix*.
Processor	2-core CPU minimum
Memory	8GB RAM
Storage	100GB We strongly recommend the use of hardware redundancy for fault tolerance.
Power	Servers must be connected to an Uninterruptable Power Supply (UPS) or some other form of auxiliary power.

Server Virtualization

The Assembly server can be virtualized. VM resource allocations must adhere to the minimum requirements listed for Assembly server hardware.

Common hypervisors include VMware ESXi and Microsoft Hyper-V, but any hypervisor that supports deploying a VM with Windows Server OS can be used.

Branch Workstations And Laptops

A Windows workstation is required to install Phoenix.

Finastra does not endorse any particular hardware vendor. Choose a vendor based on your criteria, including support and perceived reliability.

Hardware Requirements

Individual workstations must meet the following minimum hardware requirements.

Component	Minimum Requirement
Operating System	Refer to the *Platform Compatibility Matrix*.
Processor	A modern multi-core CPU
Memory	4GB RAM minimum 8GB RAM or more recommended
Storage	10GB available space or more recommended

Software Requirements

The following software is either required or recommended for Phoenix to function on end-user workstations.

- Operating System and .NET
- Deployment Manager
- Teller Receipt Printing
- Phoenix Outlook Integration
- Offline Teller

Operating System and .NET

Phoenix requires a Windows client operating system plus the Microsoft .NET Framework.

Go to the latest version of the *Phoenix Platform Compatibility Matrix* for supported versions of:

- Microsoft Windows operating system
- Microsoft .NET Framework

Deployment Manager

Phoenix provides a Windows service, Deployment Manager, that is installed on all workstations and laptops. When Phoenix is updated, Deployment Manager downloads the updated assemblies from the Assembly server and uploads them to each workstation or laptop.

Note: Deployment Manager is optional, but most clients prefer to perform updates using this software. Your Institution can leverage other software distribution applications to update assemblies on workstations. Additionally, Deployment Manager is not needed if a desktop virtualization platform, such as Citrix, is used.

Teller Receipt Printing

Teller receipt printing uses the third-party software Nexus Evolution. Nexus Evolution consists of three primary components.

- Nexus Evolution ECU: Software to configure workstation and receipt printers. Installed on the Assembly described earlier.
- SQL Database: Tracks configuration changes. Installed on the Assembly described earlier.
- Nexus Evolution Client Service: This is installed on each workstation. It receives configuration information from Nexus Evolution on the Assembly Server.

Outlook Integration

Integration with Microsoft Outlook is achieved on a client workstation via a COM Add-in. If using Office 365, please note that this is not a Web Add-In, and will not work with the web-based version of Outlook. However, Office 365 users can still take advantage of the integration with a locally installed version of Outlook.

The following components must be installed on workstations running Phoenix Outlook Integration:

- Microsoft Office Redistributable Primary Interop Assemblies
- Microsoft Office

Go to the latest *Phoenix Platform Compatibility Matrix* and navigate to the Workstation/Client section for supported Microsoft Office version information.

Note: Phoenix Outlook Integration is optional.

Offline Teller

If Phoenix Teller loses connectivity with your database server, a message is displayed prompting tellers to work in offline mode. Tellers can then temporarily post transactions to an offline database that exists on the teller workstations to later forward the transactions to the main database. After the system transitions to offline mode, tellers can continue to:

- Post transactions
- Use the online calculator
- View their teller journal of offline transactions
- View their teller summary position
- Batch totals
- Perform adjustment transactions
- Balance and closeout drawers
- Utilize the savings bond redemption calculator

Offline Teller works by temporarily posting transactions to SQL Express database that is installed on each teller workstation. Go to the latest version of the *Phoenix Platform Compatibility Matrix* for SQL Express support.

Note: Offline Teller is optional.

Desktop Virtualization

In the context of Desktop Virtualization, a thin client is an end-user device used to connect to a remote server which handles all processing, storage, and running software and operating system. It can be either a proper thin client, which is comprised of merely a monitor, keyboard/mouse, and a network connection to connect to the remote server, or a functional thin client, which is a full workstation complete with an operating system and software installed on local storage, but is only used to access a virtual desktop from the remote server its connected to. In both cases, data is never stored or processed on the local machine.

In general, Phoenix may work with several technologies to virtualize desktops.

- Citrix Virtual Desktops (formerly XenDesktop)
- VMware Horizon (formerly VMware View)

Active View Teller Capture and Driver's License Scanners are NOT supported on Desktop Virtualization solutions.

Note: The thin client server must be separate from all other on-site servers.

Teller Receipt Printing

Teller Receipt printing using Desktop Virtualization requires one of the following deployments:

1. Nexus teller receipt print drivers deployed on the workstation. Typically, this deployment is used when desktop virtualization is deployed on a full workstation, ***and*** the printers are connected via USB.
2. A Print Device server. Typically, this deployment is used when the printers are connected via Ethernet.

Print Device Server Hardware Requirements

The Print Device server is used for Teller Printing in a thin-client environment using the Nexus Evolution software. The Print Device server handles the print requests from the thin-clients and routes them to the Teller printers. One Print Device server is recommended at the Primary FI site.

This configuration is currently supported only for Citrix/Terminal server environments with Ethernet printers. Each print device server can handle no more than 20 users and 20 print devices.

The print device server is a lightweight server acting as an intermediary between the thin-clients and the print devices. As such, a PC can fulfill the requirements of a print device server.

Component	Minimum Requirement
Operating System	Refer to the *Platform Compatibility Matrix*.
Processor	2-core CPU
Memory	8 GB RAM
Storage	100 GB of free hard disk space

Statements, Reports, and Notices

This section is relevant only if you opt to print statements, reports, and/or notices in-house. If these functions are outsourced, then the following information is non-applicable.

Because Phoenix is a Windows application, it should be able to work with all laser printers that are certified for use with Microsoft Windows. Unless a printer is Windows-compliant, Finastra makes no guarantees as to its compatibility for financial institution-related print functions.

Notes:

- All Phoenix reports, notices, checks, and statements are designed for laser printers.
- All Phoenix report output is designed and tested for use with the HP PCL5 Basic Driver.

Finastra Integrated Products – Server Requirements

Information regarding on-site server requirements for each product within Universal Banking. If a product is listed as "Hosted," there may still be additional server requirements on-premises. Column information represents the standard implementation for each of these products.

NOTE: *For more information, please contact your pre-sales representative, and refer to the respective product documentation.*

Product Name	Deployment Model	Onsite Server Requirement	Virtual	Shared Server	Additional Notes
Phoenix	Hosted	1 required	✓	No – see notes	Optionally, Phoenix can be In-House (additional servers required) Onsite server should only house Phoenix components
DepositPro/EDO	On-Prem	1 required	✓	Yes – see notes	Can reside on any shared server other than CQ
OpenPath	On-Prem	1 required	✓	Yes – see notes	For use with ProSign Online with Phoenix EDO Used by CQ, DCP, and LP to communicate with all 3rd party vendors Can reside on any shared server
ECM	Hosted	None	N/A	N/A	Optionally, ECM can be In-House (2 servers required)
Fusion Analytics (FA)	Hosted	None	N/A	N/A	
Card Payments	Hosted	None	N/A	N/A	
Item Processing (IP)	Hosted	None	N/A	N/A	
Originate	Hosted	None	N/A	N/A	

Product Name	Deployment Model	Onsite Server Requirement	Virtual	Shared Server	Additional Notes
Digital Banking	Hosted	None	N/A	N/A	
CreditQuest (CQ)	On-Prem	2 required	✓	Yes – see notes	CQ and DCP app servers cannot reside on the same server. Database can be installed on any SQL server.
DecisionPro (DCP)	On-Prem	2 required	✓	Yes – see notes	DCP and CQ app servers cannot reside on the same server. Database can be installed on any SQL server.
LaserPro (LP)	On-Prem	1 required	✓	Yes – see notes	Can reside on any shared server other than CQ.
RapidWires	Hosted	None	N/A	N/A	Thick client to be installed on end-user workstation. Transaction limit of 3000 wires per month and supports FedWire.
Payments to Go	Hosted	None	N/A	N/A	Unlimited wire transactions. Supports FedWire, SWIFT, ACH, Real-time Payments, and Callers and Caller Passwords.
Treasury (Opics)	On-Prem	2 required 1 optional	✓	Yes - recommended	Hosting available is only through a partner. Environment must be replicated to DR and UAT sites.

Finastra Support

Finastra support offers several options to help you get the most out of your software, including a self-service Case Management tool, and phone support.

Please visit the Finastra Customer Success Community at https://support.finastra.com to log in to our online self-service Case Management system. If you forgot your password, simply click the Forgot Password link. Once logged in, you have the ability to use the Finastra Customer Success Community to troubleshoot issues and find answers to questions.

If your financial institution is not currently using these tools and would like to, please contact Finastra support for assistance.

Note: The Financial Modernization Act of 1999, also known as the Gramm-Leach-Bliley Act or GLB Act, includes provisions to protect consumers' personal financial information held by financial institutions. Therefore, Finastra support cannot accept data or screen captures that contain personal financial information via email or fax. For information about secure file transfer methods, contact Finastra support.

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North American Headquarters
744 Primera Boulevard
Suite 2000
Lake Mary, FL 32746
United States

T: +1 888 989 9009