NUTANIX
YOUR ENTERPRISE CLOUD

Xi Frame Storage Options

Nutanix Tech Note

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1. Executive Summary

Xi Frame is a secure cloud platform that allows enterprises and independent software vendors (ISVs) deliver applications and software-defined workspaces to users. Users only need a connected device with a modern web browser. There are no clients, downloads, or plugins to install.

Frame is a public, cloud-native platform that Nutanix has adapted to support on-premises infrastructure while remaining agnostic regarding infrastructure as a service (IaaS) providers. Organizations can run Frame on Microsoft Azure, Amazon Web Services (AWS), or their own on-premises Nutanix AHV clusters through a single management console. Using Xi Frame, you can automatically provision and deprovision capacity worldwide and across IaaS providers to adjust to fluctuations in end-user demand.

Depending on your desired user workflow and the location of your users' files, you can choose a storage approach from a range of options. This guide outlines the common storage options used with Frame and discusses how to choose the right storage option based on your workflow. We also cover the benefits, applicability, requirements, and user experience for each option.

Table 1: Document Version History

Version Number	Published	Notes
1.0	September 2019	Original publication.

2. Choosing the Right Storage Option

Choosing the right storage option for specific use cases and unique workflows can be challenging. In this guide, we provide the relevant details for each storage scenario, with links to additional resources to help streamline your selection process.

Frame recommends that you first determine the technical requirements for your storage needs:

- Where do you currently store your data and files?
- What applications are dependent on these files?
- Do your users need to collaborate on the same files at the same time? (This use case is common with architecture, engineering, and construction design files.)
- Are your users located in one region or dispersed geographically?
- What is the typical size of the files that your users open and save?
- How long does it currently take for your users to open and save files?
- What are your current and projected storage capacity needs?
- Are you planning to move your enterprise storage to the cloud?

3. Using Files from Your Local Device

3.1. Local Device Solution Overview

Uploading and downloading files to and from the Frame session is the simplest option for accessing your files through Frame. Users can drag and drop files from their local file explorer into the Frame session. The file then automatically uploads into a dedicated **Uploads** folder in the session and persists until the session ends. This solution also allows your users to download files from their Frame session to their local machine by saving or dragging them into the **Download Now** folder of the Frame system.

3.2. Local Device Benefits

Using files from your local device as a storage solution with Frame offers the following benefits:

- Supported out of the box and requires no additional setup.
- User-friendly and simple to use.
- No associated costs.

3.3. Local Device Applicability

Frame recommends this solution if your users do not have a cloud storage account and require access to some of their local files. When users need repeated access to large files or many files, a different solution is likely to be a better fit. The built-in upload and download options are best suited for short-term use, unless you are using them in combination with persistent desktops.

3.4. Local Device Requirements

These session settings are enabled by default. To manage these options, account administrators must navigate to the **Settings** page of the account dashboard and select the **Session** tab. The Features section on this page contains the controls for **Download** and **Upload**.

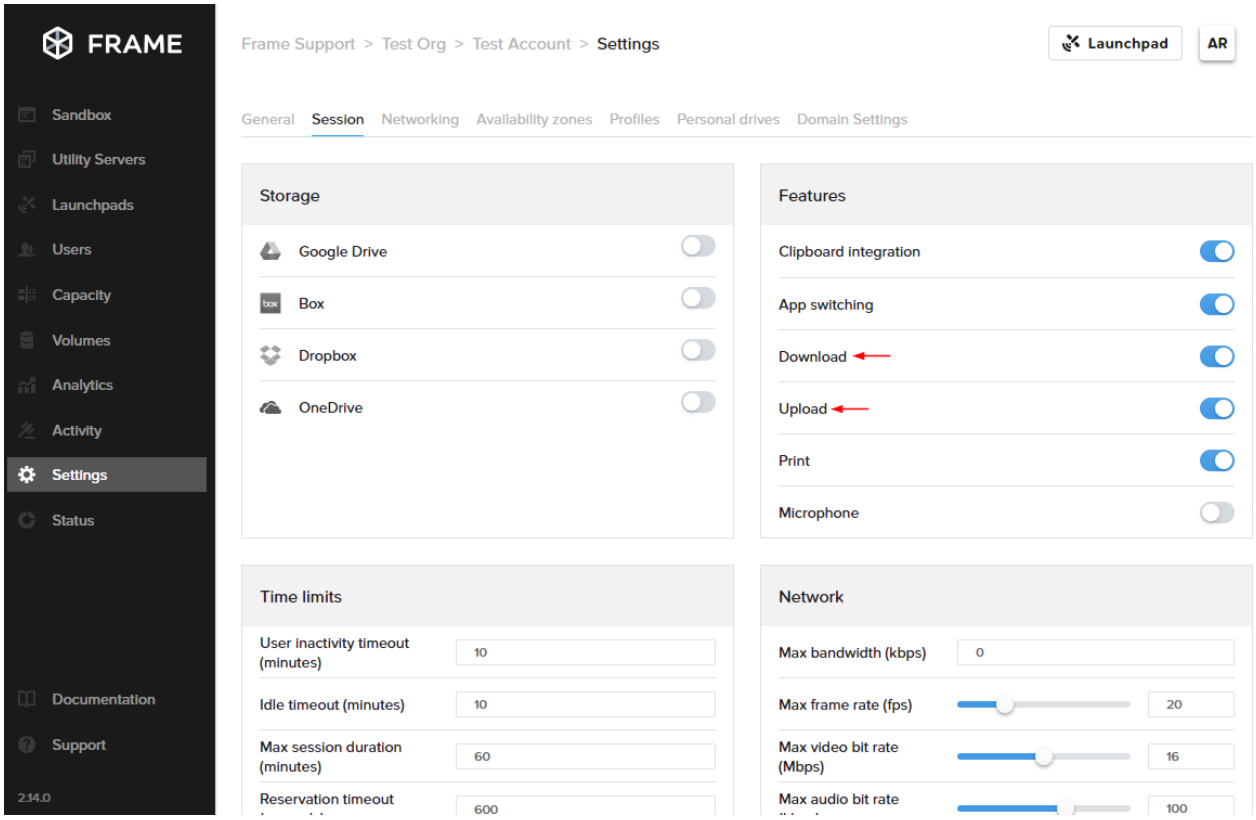

Figure 1: Download and Upload Setting

3.5. Local Device User Experience

When your user's account has this feature enabled, they can see the uploads icon on the Frame Status Bar, as shown in the following figure.

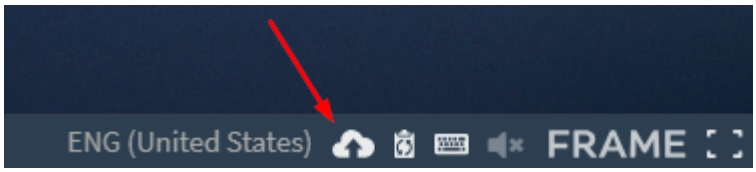

Figure 2: Uploads Icon on Frame Status Bar

Users simply open their local file explorer and navigate to the file they want to transfer. With the Frame session still open, the user drags their local file into their Frame window. They can also select the Uploads icon on the Frame status bar to open a local file browser and then navigate to their file.

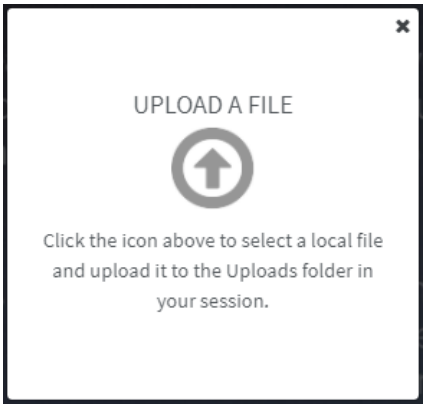

Figure 3: Frame Upload Window

The Frame Status Bar displays the upload status.

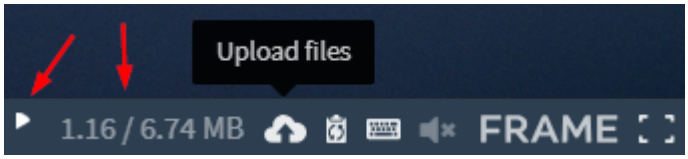

Figure 4: Upload Status in the Frame Status Bar

Once the upload is complete, the file becomes available in the **Uploads** folder during the session.

To download files from their Frame session to their local computer, users can simply move the desired files into the **Download Now** folder of their Frame Explorer in the session. The browser window shows the download progress.

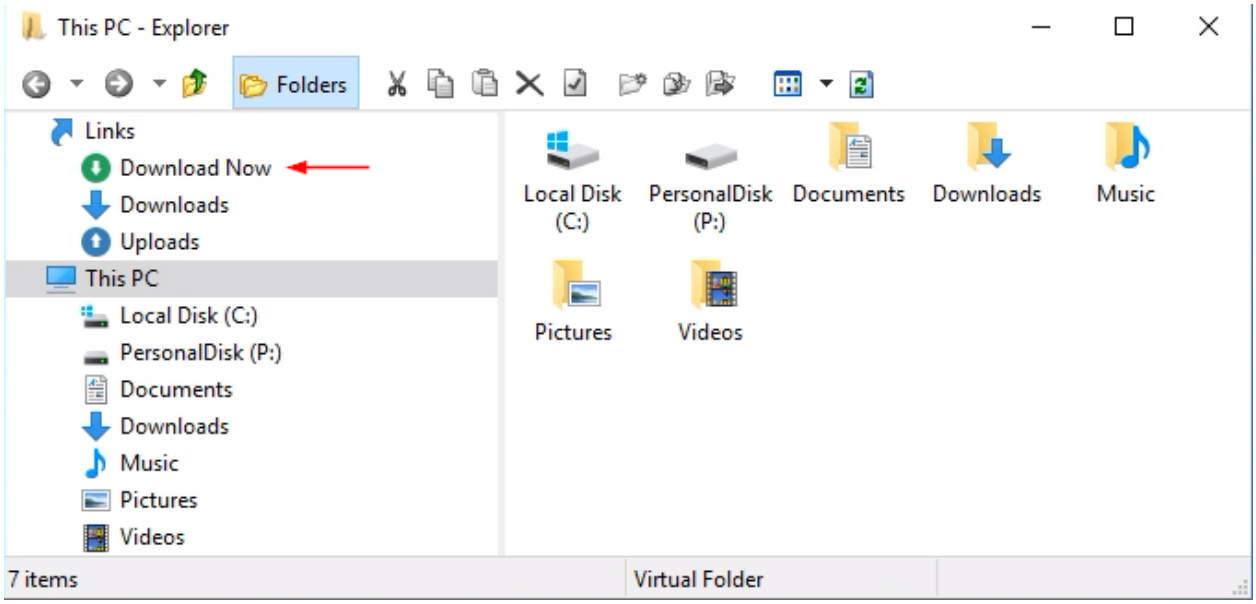

Figure 5: Local Download Folder

3.6. Local Device Solution Architecture

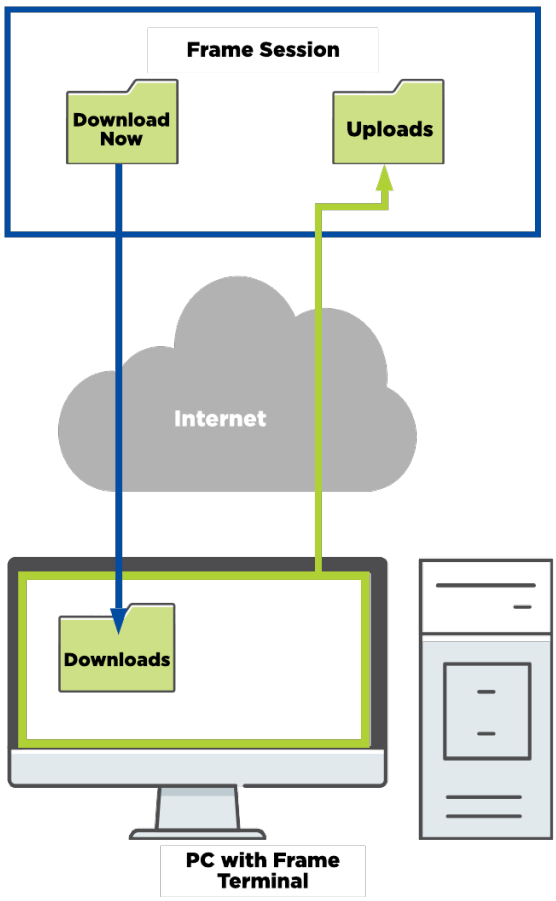

Figure 6: Local Device Storage Solution Architecture

3.7. More Information on Using Files from Your Local Device

- Refer to the official documentation on end-user files for more information on this feature.

4. Cloud Storage

4.1. Cloud Storage Solution Overview

The Xi Frame platform integrates with four leading cloud storage providers: Microsoft OneDrive, Dropbox, Google Drive, and Box. The Frame environment can use cloud storage as a drive shared between Frame team members, or team members can access their own individual cloud storage accounts with just a few clicks. Our integration does not sync the entirety of the cloud storage drive, but instead uses a filter driver to intercept interactions with your cloud storage provider and make your files available on demand. Once a user interacts with a file, Frame immediately begins transferring that file to a temporary folder on the Frame VM's local disk for you to use. After you save the file, Frame transfers it back to your cloud storage.

4.2. Cloud Storage Benefits

Using cloud storage drives as a storage solution on Xi Frame offers the following benefits:

- It's easy to mount and unmount cloud storage.
- Easy for end users to manage.
- File transfers are fast and streamlined, as the Frame session is connecting to another cloud service.
- Files sync to the Frame session only as the user accesses them, which minimizes resource consumption.
- You can manage your cloud storage capacity through the cloud storage provider.

4.3. Cloud Storage Applicability

This solution is applicable to many workflows and use cases for organizations already comfortable with cloud storage. Cloud storage may be a good option to consider if you have not yet established a storage solution and have a small to moderate amount of data to access. Organizations that depend on simultaneous collaboration and frequently work with large files may find one of the other storage solutions more advantageous.

4.4. Cloud Storage Requirements

To use this option, you must have an account with at least one of the four cloud storage providers integrated with Frame. There is no cost to use this Frame feature; however, you may incur additional costs with your cloud storage provider as your storage capacity consumption increases.

4.5. Cloud Storage User Experience

Administrator

To specify which integrated cloud storage providers are available in the session, an account administrator can access session settings from their account dashboard.

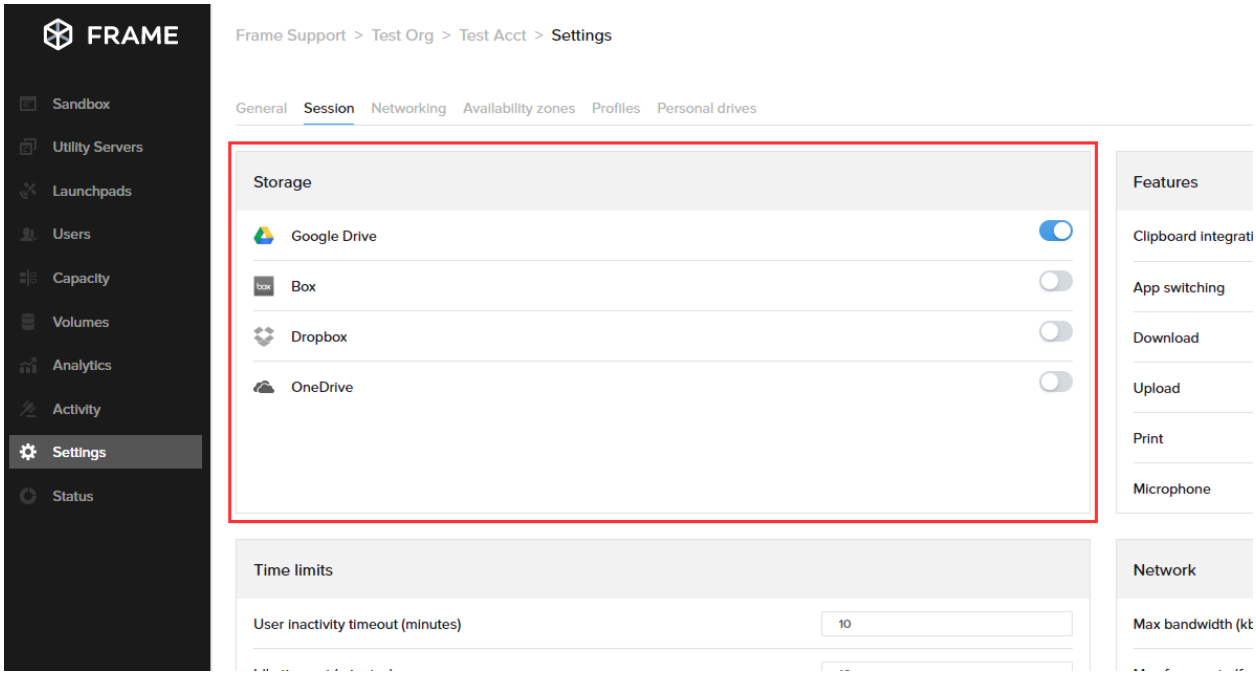

Figure 7: Enable Cloud Storage Providers

User

Users only see the storage options for their session that the account administrator has enabled.

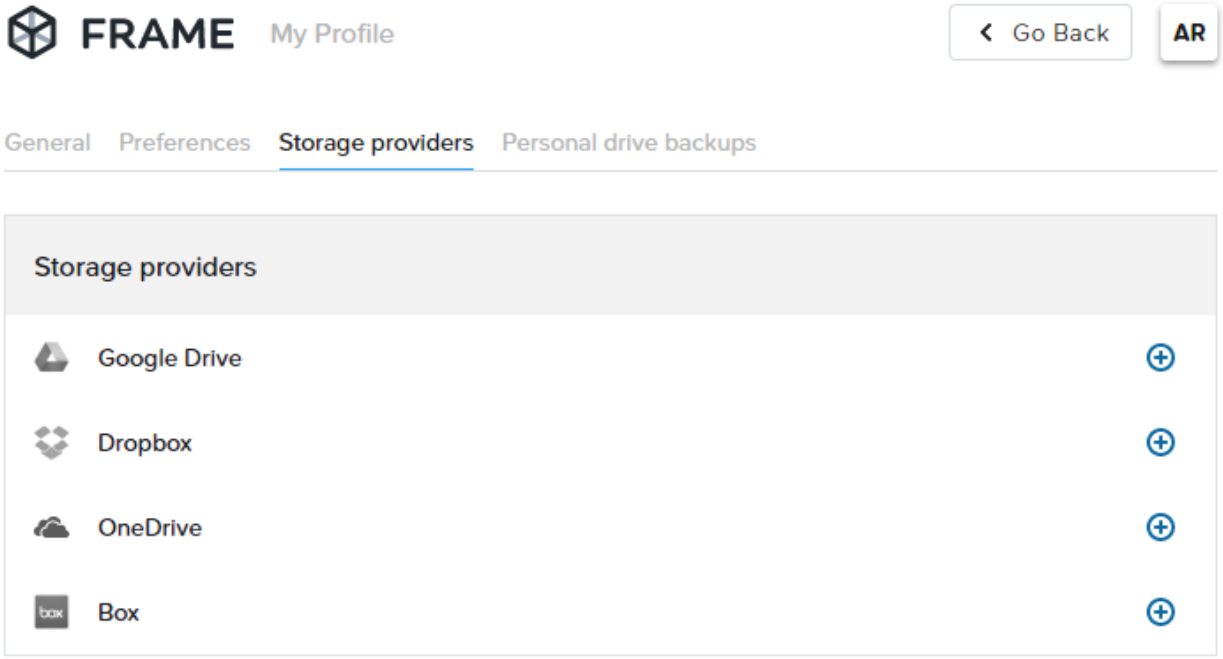

Figure 8: Cloud Storage Providers

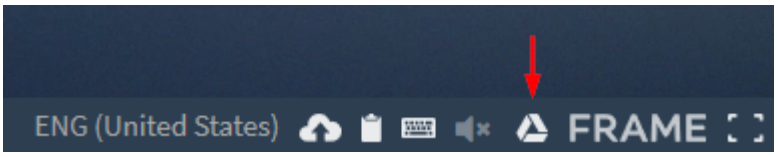

Figure 9: Enabled Cloud Storage Provider on Frame Status Bar

4.6. Cloud Storage Solution Architecture

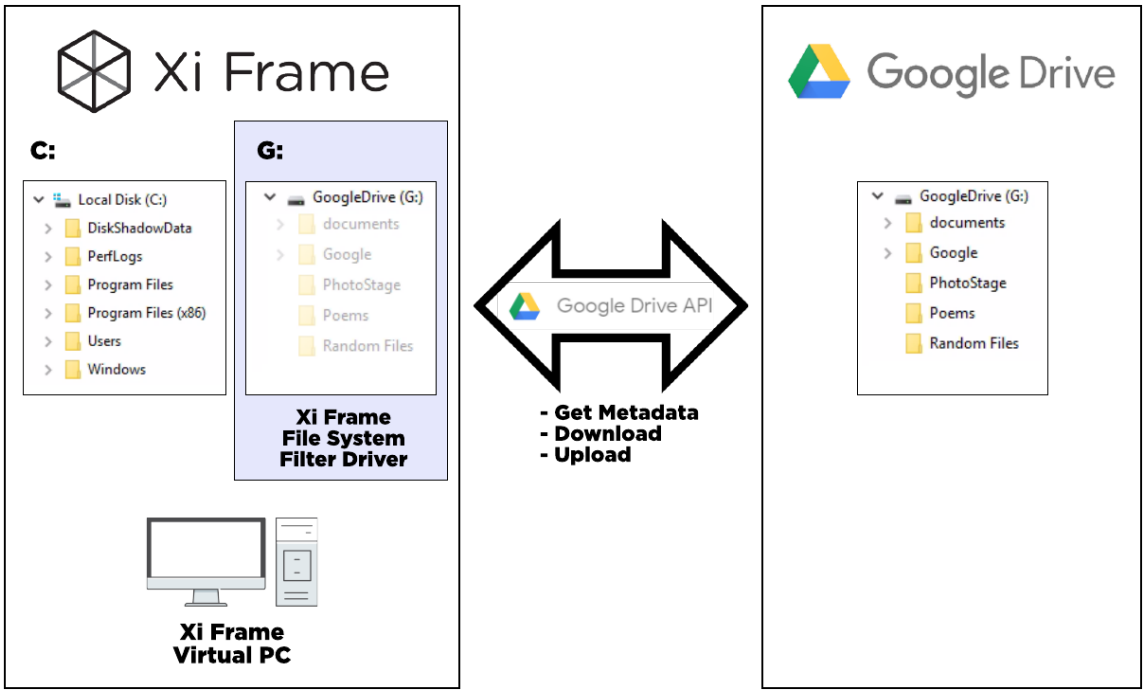

Figure 10: Cloud Storage Solution Architecture

4.7. More Information on Cloud Storage

- Consult the official Nutanix Frame documentation on cloud storage.
- Refer to Microsoft's documentation for more information about the file system filter driver.

5. Xi Frame Personal Drive

5.1. Xi Frame Personal Drive Solution Overview

Xi Frame provides each of its users with fast, privately hosted network storage called a Personal Drive. The Personal Drive is mounted as a mapped network drive (P: for the drive letter). Administrators configure the initial size of users' Personal Drives and have the option to enable autogrow settings. Autogrow settings are a set of customizable parameters that instruct the IaaS provider to increase the storage capacity of each volume when a user begins to run out of free space. The specific way P: drive integrates with Frame depends on the cloud infrastructure provider you choose. Users can manage their own backups from the My Profile page, which is accessible from the Launchpad interface.

AHV

When configuring Frame on AHV, administrators must opt in for the Personal Drive feature before connecting their Cloud Connector Appliance (CCA) to their cluster. AHV dynamically provisions and assigns a virtual volume for each user.

AWS

For AWS accounts, Frame provisions and assigns an EBS volume to each user. The AWS account administrator must first specify an availability zone, because the resources must be accessible from the same availability zone the VM pool uses. When a user connects for the first time after the account has enabled the Personal Drive feature, their VM is provisioned with the EBS volume attached. Administrators can move between availability zones as needed.

Azure

For Microsoft Azure accounts, Frame uses Azure Managed Disks. Azure Managed Disks enables Personal Drive creation, mounts the drive to the user's VMs, and provides an extremely high-performance connection to the drive's data. Azure does not require an additional managed file server.

5.2. Xi Frame Personal Drive Benefits

Adopting Frame's personal drive as a storage solution offers the following benefits:

- Dynamically scaled storage per user, available for use with any workflow.
- Users can manage Personal Drive backups from their My Profile page.

- Administrators can schedule automatic backups for Personal Drives and set the retention schedule directly from the dashboard interface.
- Data is encrypted and stored in an AWS Virtual Private Cloud (VPC) or Microsoft's Azure Managed Disks (which both use industry-standard encryption). Xi Frame customers using AHV benefit from data-at-rest software-based encryption at the cluster level.

5.3. Xi Frame Personal Drive Applicability

This storage option best suits customers who want each authenticated user to have personal dedicated drive space managed by Frame. Administrators can adjust the initial storage capacity of Personal Drives for their users at any time. They can also configure Personal Drive storage capacity increases to occur automatically based on parameters they set using autogrow settings. Because the Personal Drive is in the same VPC or VNet that the VM the user is accessing in public cloud implementations, you can expect better performance than if the system accesses files from cloud storage or on-premises using a VPN gateway.

5.4. Xi Frame Personal Drive Requirements

Customers incur storage costs from the IaaS provider. For AWS-based accounts, the administrator must select an availability zone before enabling the Personal Drive feature. If necessary, administrators can use the Frame interface to change availability zones for their users. Customers setting up Xi Frame on AHV must select a checkbox to indicate if they plan to use Personal Drives or Enterprise Profiles on their account. As a page in the CCA setup wizard, the customer must specify the container to house Personal Drives.

5.5. Xi Frame Personal Drive User Experience

For both administrators and team members, the P: drive appears as an additional drive letter (always P:) in the Frame session.

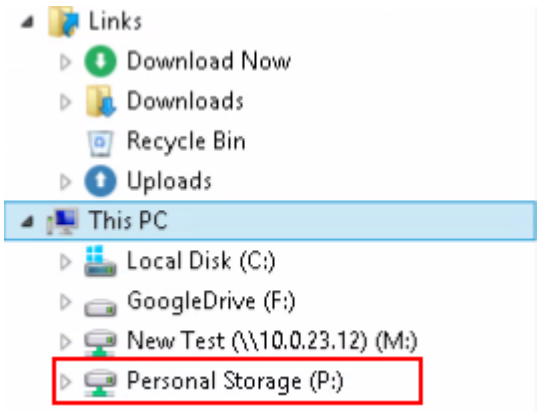

Figure 11: Drive in Frame Session

5.6. Xi Frame Personal Drive Solution Architecture

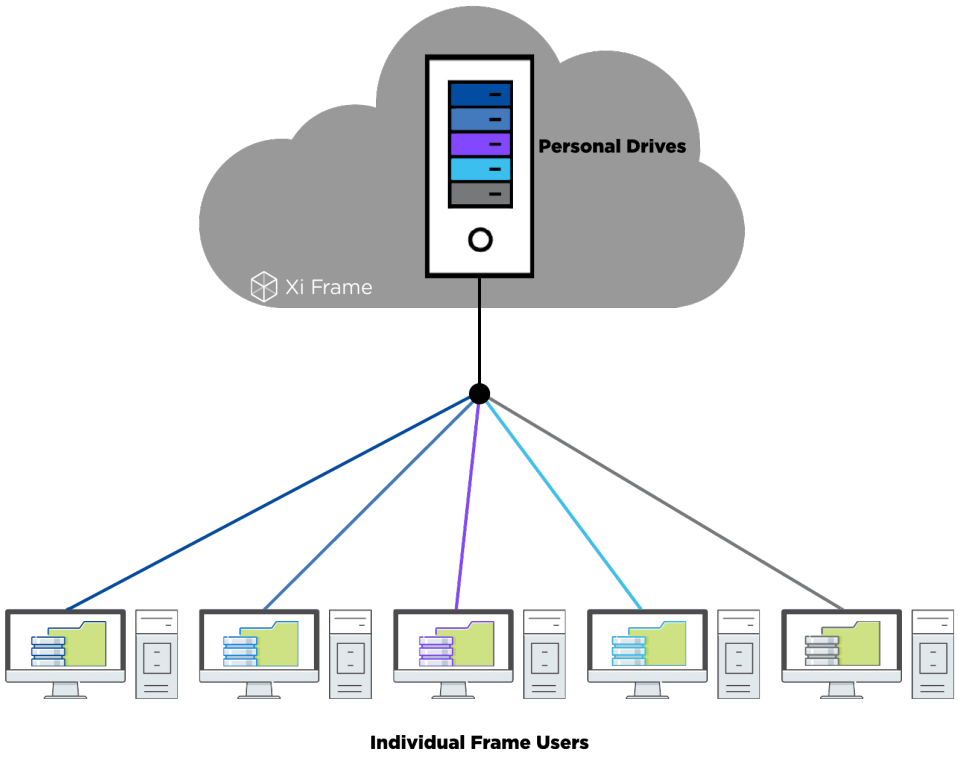

Figure 12: Xi Frame Personal Drive Solution Architecture

5.7. More Information on Xi Frame Personal Drive

- Read more about Azure Managed Disks from Microsoft's official documentation.
- More information about AWS EBS Volumes is available from Amazon's official documentation.
- Nutanix AHV best practices guide.
- Nutanix cluster storage components.

6. Xi Frame Utility Server as a Storage Server

6.1. Xi Frame Utility Server Solution Overview

Administrators can provision and configure a Xi Frame Utility Server from their account dashboard as a dedicated storage server with file shares available to users as a mapped network drive. You can easily access the Utility Server from the account dashboard, just like a Sandbox. It is also stateful, which means that data persists on the VM just as it would on an on-premises file server. In general, a Utility Server is permanently powered on to ensure that data is available to your users whenever they need it.

6.2. Xi Frame Utility Server Benefits

Using a Utility Server as a storage solution offers the following benefits:

- Depending on the IaaS provider chosen, data is stored within the same VPC or VNet as your Sandbox and production instances, making this solution very efficient.
- Once the server is configured, your users have around-the-clock access to the same file share, which is beneficial in use cases that require intensive team collaboration.
- You can adjust the Utility Server system specifications to meet your unique workflow requirements at any time. Administrators select image family, VM type and size, and storage size upon creation, as with Sandbox configuration.
- Administrators can increase storage capacity at any time from the dashboard.
- Administrators can schedule backups for Utility Servers to ensure data redundancy.

6.3. Xi Frame Utility Server Applicability

Frame recommends this option if you have users or applications requiring access to one or more shared files. In public cloud implementations, the storage server (here, the Utility Server) is located within the same VPC or VNet as the Sandbox and production workload VMs.

6.4. Xi Frame Utility Server Requirements

Using the Frame Utility Server as a storage solution requires the account administrator to configure SMB shares on the server. For BYO Xi Frame subscriptions, this storage solution

incurs additional costs from your IaaS provider for resources. For Xi Frame subscriptions that are not BYO, Utility Server costs depend on the system specifications.

6.5. Xi Frame Utility Server User Experience

When it is configured as a file share, the Xi Frame Utility Server appears to users as an additional drive letter in the Frame session.

Administrator

The administrator can easily access and configure the Utility Server from the account Dashboard.

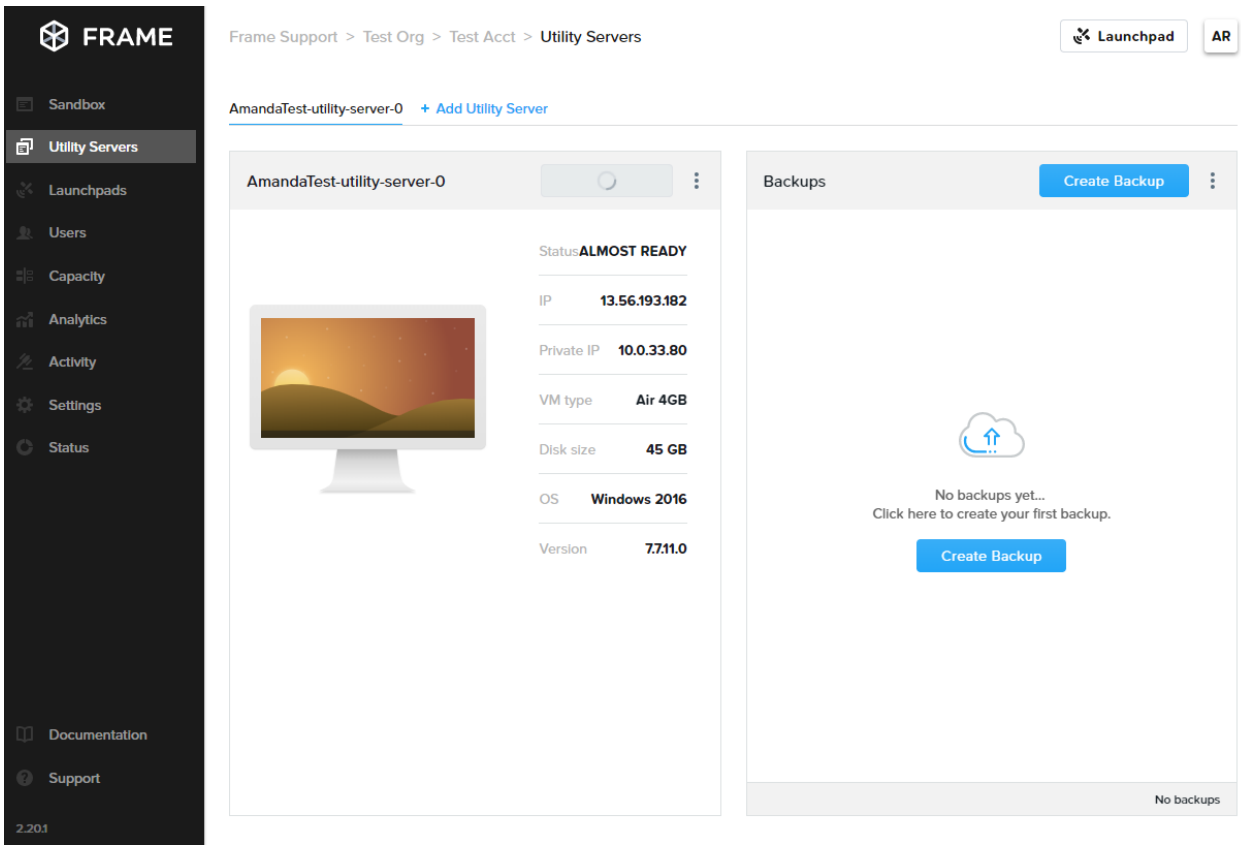

Figure 13: Utility Server on the Dashboard

User

Users simply see an additional drive letter in their file explorer while in the session.

6.6. Xi Frame Utility Server Solution Architecture

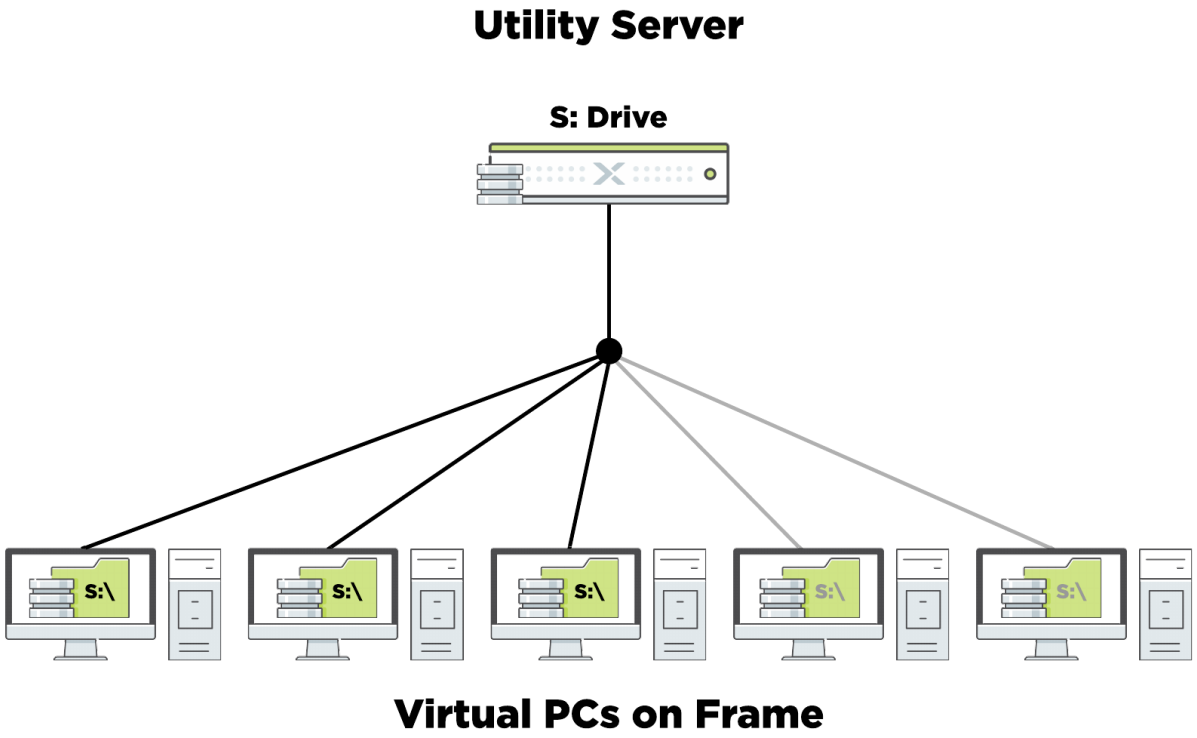

Figure 14: Xi Frame Utility Server Solution Architecture

6.7. More Information on Xi Frame Utility Server

- For more information about the Xi Frame Utility Server, refer to our documentation.
- For more detailed steps on configuring Frame Utility Servers as network drives, refer to this document on shared folder creation.

7. On-Premises File Server

7.1. On-Premises File Server Solution Overview

Frame also supports organizations that prefer to leave their storage in their existing on-premises networks. The customer manages their own on-prem file server, which their users access over a VPN tunnel, assuming the file server is behind a firewall.

7.2. On-Premises File Server Benefits

Using an on-prem file server offers the following benefits:

- Allows organizations to use their established on-prem storage.
- Removes the need to replicate file storage in the cloud.
- You can connect multiple on-prem servers from multiple locations to your Frame account.

7.3. On-Premises File Server Applicability

If you would prefer not to move your data to the cloud, connecting to your existing on-prem storage is the most straightforward option.

Opening and saving large files is slower than opening and saving files locally from on-prem workstations, because the system must copy files from your on-prem file server to the cloud and back again. Performance can vary greatly depending on the geographical distance between the VPC or VNet in your cloud region and your on-prem resources, as well as the upload and download speeds of your on-premises network connection.

7.4. On-Premises File Server Requirements

This solution requires either a software or hardware VPN. Typically, our customers work with Frame initially to configure and connect the on-prem file server to be accessible from the Frame-managed cloud network. In domain-joined environments, workload VMs automatically join the enterprise Active Directory domain. Users' mapped network drives are joined to their VMs once they authenticate to the domain controller.

7.5. On-Premises File Server User Experience

From the Frame session, the on-premises file server appears as an additional drive letter in the file explorer or when browsing files through an application. In most scenarios, your users log on with their credentials (for example, with their Active Directory credentials) to access the on-prem file server.

7.6. On-Premises File Server Solution Architecture

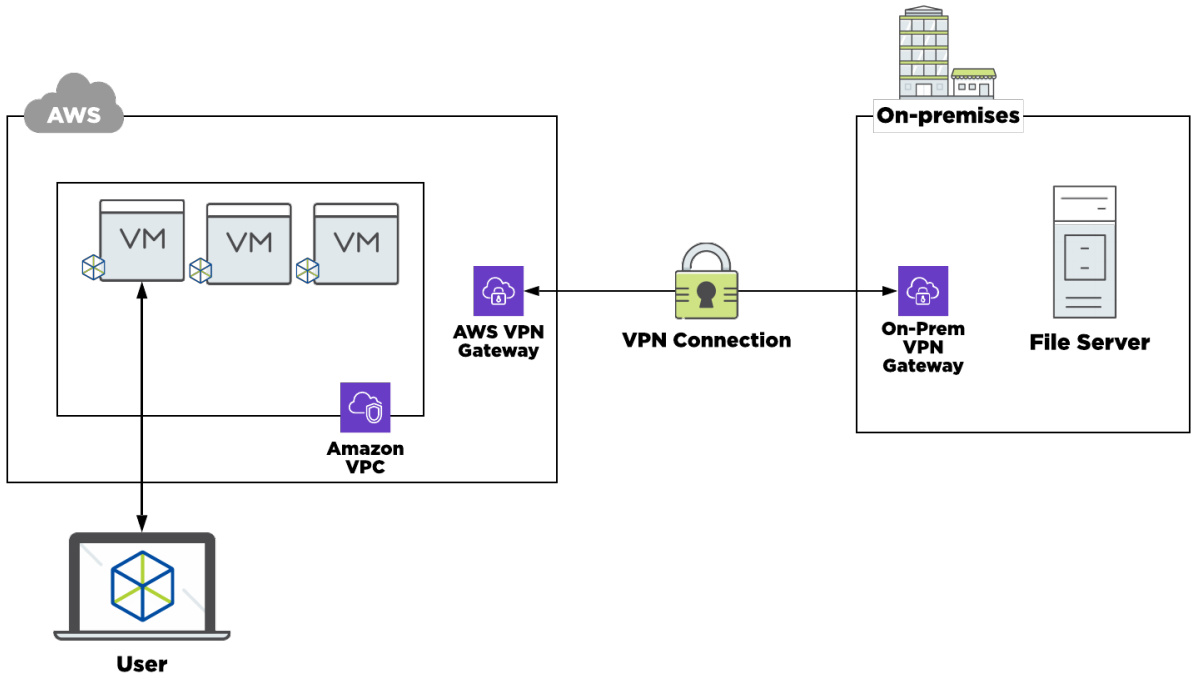

Figure 15: On-Premises File Server Solution Architecture

7.7. More Information on On-Premises File Servers

- For more information about using a VPN with Frame, check out our Xi Frame Networking Options tech note.

8. Nutanix Files on AHV

8.1. Nutanix Files on AHV Solution Overview

Nutanix Files enables customers to share files across user workstations or VMs in a centralized and protected location to eliminate the requirement for a third-party file server. Running on Nutanix AOS, Files uses a scale-out architecture that provides file services to clients through the Server Message Block (SMB) or Network File System (NFS) protocol. Files supports the SMB 2.0, SMB 2.1, and SMB 3.0 protocols. Files consists of three or more file server VMs (FSVMs) combined into a logical file server instance called a Files cluster. Files supports creating multiple file server instances in a single Nutanix cluster.

8.2. Nutanix Files on AHV Benefits

Using Nutanix Files as a storage solution on Xi Frame offers the following benefits:

- File storage for departmental and ROBO shares, home directories, and file clouds provides simplicity, flexibility, and scalability.
- Single-click deployment takes minutes and scales easily on commodity hardware.
- End users experience fast file opens and saves to Files because there is low latency between the Frame-managed workload VMs and Files.
- Analytics integrated with Nutanix Files provides helpful tool tips for easy navigation of data insights.
- Files ensures that data is available during software upgrades, hardware upgrades, and unexpected failures without bottlenecks or single points of failure.

8.3. Nutanix Files on AHV Applicability

Frame recommends Nutanix Files for organizations using AHV and their on-premises cluster as their private cloud-hosting infrastructure. Nutanix Files is a software-defined, scale-out file storage solution. It improves storage services by providing high availability, massive scale, simplified self-service management, self-tuning, and self-healing. Unlike other NAS solutions, you can deploy Nutanix Files alone or as part of your Nutanix Enterprise Cloud OS. VM workloads and file storage are on the same cluster, eliminating the complexity of deploying and managing a separate infrastructure stack for standalone NAS solutions. Administrators can add a storage-heavy or storage-only Nutanix node to the cluster and deploy additional file server VMs instantaneously, using automated load balancing and intelligence for self-healing.

Native snapshots, changed block tracking, and self-service restore make file recovery extremely easy. Organizations can deploy Files on standalone clusters solely designated for file serving or integrate Files where VMs and data live on the same cluster.

8.4. Nutanix Files on AHV Requirements

The integration requires both Xi Frame and Nutanix Files to be part of the same Windows Active Directory domain. The Frame account must be joined to a domain, and Files must be joined to the same domain.

8.5. Nutanix Files on AHV User Experience

Administrator

To use Nutanix Files on AHV, administrators must join the Xi Frame account to the domain. The users must authenticate to this domain. Once users have authenticated to the domain, the system applies their mapped network drive policies before they connect to a session.

User

The Nutanix Files server appears as an additional drive letter in the Xi Frame session. Users access this drive just like a regular drive, either from the file browser in the session or through an application. Most use cases require users to log on with their credentials (for example, their Active Directory credentials) in order to access the Nutanix Files server and shares.

Nutanix Files on AHV Solution Architecture

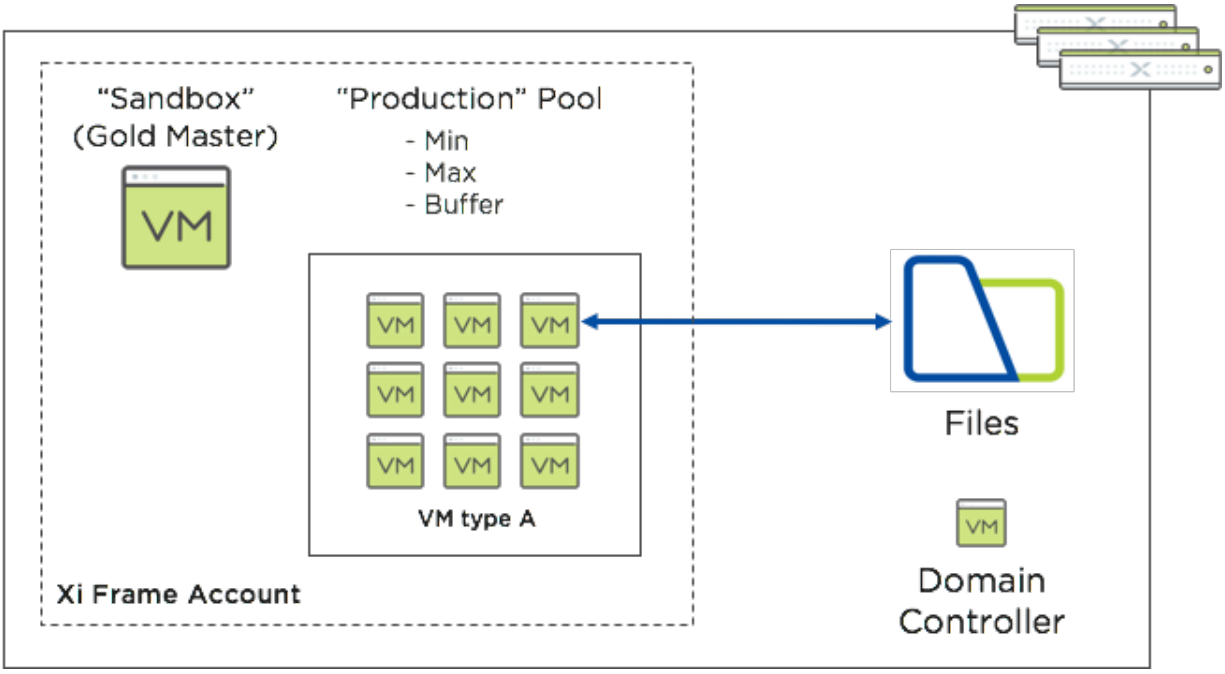

Figure 16: Xi Frame and Files on AHV

More Information on Nutanix Files on AHV

- For further information, visit www.nutanix.com/frame and www.nutanix.com/files or speak with your Nutanix Account Manager.

9. Cloud-Backed File Services and Locking NAS

9.1. Cloud-Backed File Services and Locking NAS Solution Overview

Customers with globally distributed users in multiple offices or remote offices, or using mobile devices, often need to collaborate on common file sets. These users need to be able to read and write quickly from any location at any time. They depend on the ability to edit files without other users writing to (and possibly corrupting) the same files. Additionally, globally distributed users must be able to consistently access their data, no matter where they are or which file server they are accessing at that moment. With this storage solution, users should see the same overall open file and save file performance they would expect from opening and saving files to servers in the same LAN.

If you have any of these requirements, consider a storage solution that supports multisite and cloud access with real-time global file synchronization and locking capabilities. Your storage solution should be able to support your users without any performance degradation as the number of file sets and users increases.

9.2. Cloud-Backed File Services and Locking NAS Benefits

Using a cloud-backed global file system with file synchronization and locking offers the following benefits:

- Consistent view of all files on the global file system no matter where the user is located.
- Using deduplication, caching, and compression for opening and saving files optimizes performance to and from the cloud-backed storage.
- Real-time synchronization of file changes across the global file system.
- File locking enables collaboration and file set consistency.
- Backup and archive security for all files in the cloud.

9.3. Cloud-Backed File Services and Locking NAS Applicability

Frame strongly recommends this storage solution for situations where users are geographically dispersed, need to collaborate on the same files, operate from two or more offices, or require efficient global file synchronization.

9.4. Cloud-Backed File Services and Locking NAS Requirements

This option may require a separate VPC or VNet to run an Active Directory server (joined to the corporate Active Directory), a virtual storage file server, underlying IaaS storage, and network connectivity (VPN tunnels or VPC peers) to all other storage controllers that make up the storage fabric.

9.5. Cloud-Backed File Services and Locking NAS User Experience

Administrator

The administrator maps the Xi Frame account to the domain for this feature to work. Users must authenticate to their domain; once they have done so, their mapped network drive policies are applied before they connect into a session.

User

Users simply see a drive letter for each mounted file share.

9.6. Cloud-Backed File Services and Locking NAS Solution Architecture

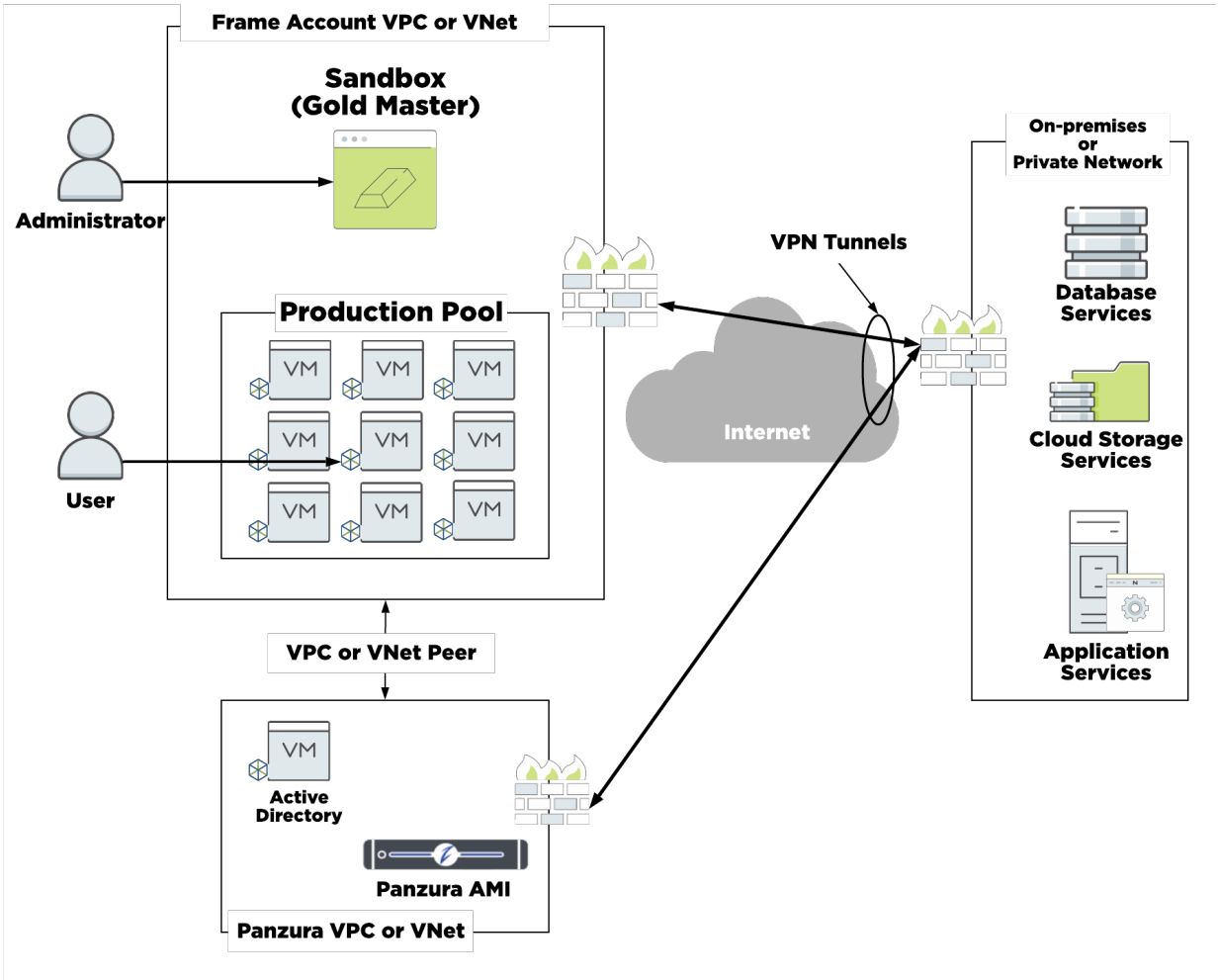

Figure 17: Cloud-Backed Network-Attached Storage Solution Architecture

9.7. More Information on Cloud-Backed File Services and Locking NAS

Panzura offers one example of a global locking and caching network-attached storage solution. For more information on how Panzura cloud-backed global file synchronization and locking network-attached storage works, refer to https://panzura.com/products/.

Appendix

About Nutanix

Nutanix makes infrastructure invisible, elevating IT to focus on the applications and services that power their business. The Nutanix Enterprise Cloud OS leverages web-scale engineering and consumer-grade design to natively converge compute, virtualization, and storage into a resilient, software-defined solution with rich machine intelligence. The result is predictable performance, cloud-like infrastructure consumption, robust security, and seamless application mobility for a broad range of enterprise applications. Learn more at www.nutanix.com or follow us on Twitter @nutanix.

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