



Release 13.4 – June 2021

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What's New in V13.4: Main Changes

Improved Screen Capture for Windows Hosts

The screen capturing engine, also known as User Mode Screen Capture (UMSC), has been updated to use Microsoft's DirectX Graphics Infrastructure (DXGI). This results in a more responsive remote control and viewing experience. This update ensures we are using the most modern and high-performance APIs available to us.

PC-Duo Host for Windows Screen Blanking Support

The ability to blank the remote Windows Host console during Remote Control has been reintroduced. This provides the remote user privacy while performing sensitive operations. This feature had been available in much older versions of PC-Duo but had to be removed when changes to the Windows operating system made it unreliable. With this release, it has been completely redesigned and uses modern technology that allows us to ensure screen blanking is reliable. This new method also allows us to display a message on the remote Host console indicating that the machine is currently connected to by a technician. All PC-Duo clients have been updated to be able to request screen blanking of the remote Host and the Host itself will be configurable to allow or disallow this feature. The Host will advertise the availability of this feature to the Master client and only then will it become an option for the client. Keyboard and mouse input will also be suppressed while the screen is blanked. This is necessary so that a console user cannot interfere with the remote-control session. As a failsafe, C-A-D will still function at the console to get to the Windows Lock Screen. This screen will be operable by both the remote-control connection and the console user, giving the console user the opportunity to log out the session or restart the computer.

This new functionality applies only to Hosts running on Windows 10 (build 2004) and later and requires a v13.4 Master.

Improved secure relationship between Hosts and Gateway

The relationship between the Host and Gateway server has been rearchitected. This allows us to deprecate the proprietary "Shared Secret", when it was needed, and makes things more reliable and easier to manage. This relationship is now standards-based identification using SSL certificates and the TLS protocol. Note that this new relationship is in effect for Host v13.4 when communicating with Gateway Server v13.4; combinations involving older versions will continue with the existing behavior (e.g. Windows Auth if available or Shared Secret).

Web Console "Move Group" Functionality

The Web Console now offers a "Move Group..." context menu item on Groups, that allows the group (and all of its members and descendants) to be moved to a different location in the Group hierarchy.

Web Console "Change Group Memberships" Improvements

The Web Console now provides a better user experience when changing the Group memberships of multiple Hosts. When multiple Hosts are selected and "Change Group Memberships..." is selected, the "Change Group Memberships" dialog appears. Note well that in this case, the dialog only shows the currently selected group, and not all memberships that these Hosts have. The key improvement in this case is when the "+" button is used to add Group memberships, a confirmation dialog appears showing that the group membership change was successful, and how many Hosts were modified. The Change Group Membership dialog remains open, with the same Hosts selected, so additional operations can be performed.

Azure Active Directory Integration now uses Microsoft Graph API

In earlier versions of PC-Duo, the Azure AD integration used the Azure AD Graph API to query data from AAD. In this release, PC-Duo now uses the newer Microsoft Graph API. When upgrading a PC-Duo server that has already been integrated with an Azure AD using the older Azure AD Graph API (v13.3 and earlier), the installer will detect this and offer both guidance and confirmation that the necessary permissions have been updated in Azure prior to continuing the upgrade.

Support for European Keyboards in the HTML5 client

Although the installed Master and ClickOnce connection windows support reliable remote control of certain European keyboards, the HTML5 remote control client did not. Support for this has been added and tested with QWERTY and DVORAK keyboards against French, German, Spanish, and Portuguese.

PC-Duo Host Installation Improvements

As of this release, the PC-Duo Host no longer ships kernel mode drivers in the Host. This provides an improved installation/upgrade experience by eliminating or at least minimizing the need for a reboot after a new Host is installed. When upgrading from earlier versions of the Host, the drivers are automatically uninstalled, and a system restart is necessary to complete that uninstallation. Clean installation of Host v13.4 no longer requires a restart, and upgrades of Host v13.4 to later versions should not require a restart and will leave the Host service running in a usable state.

Note that in prior versions of PC-Duo, the Host utilized kernel mode drivers for the following functionality:

- Kernel -mode (mirror driver) display capture
- Input injection at kernel level
- Input suppression at kernel level

Additionally, The Host service in the Service Control Manager will now set automatic restart options, like the Gateway Server does. This helps ensure the Host restarts if it fails for any reason.

Host and Master for iOS and Android

Host for iOS and Host for Android, and Master for iOS, have been updated in their respective App Stores. Enhancements include full support for PC-Duo v13.4 features, device-wide “Dark Mode” option in the Master, improved ability to share diagnostic logging if needed, ability for an Administrative Web Console user to “Stop Host Instance” on the mobile device, and various small improvements in stability and reliability. As of this writing, current version is 10.4.3905 (Host) and 10.4.3906 (Master)

What’s New in V13.3: Main Changes

Host for Mobile (Android and Apple iOS Devices)

Version 13.3 introduces support for screen viewing of Android devices (v8 “Oreo” or later) and Apple iOS devices (iOS v11.2 or later). These phones and tablets will run a native application that will provide an On-Demand Host (HOD) that can be configured to report to a standard v13.3 PC-Duo Server.

New and Easier Identification of All Hosts – Installed and HOD

A new mechanism to help identify a specific Host, installed or on Demand (HOD), in the Web Console or installed Master has been implemented. The Host instance will be assigned a unique 6-digit personal identification number (PIN) that the end user can provide to the Master user for quick identification. This will be the case for all Host

implementations, both installed and On Demand and for all platforms (Windows, Macintosh and the new Android and iOS sessions). This is especially helpful for non-enterprise managed machines where station names may not contain information that is meaningful to the Master user.

Quick Connect ability directly from the Web Console Landing Page

A Host can now be connected to by simply entering the 6-digit PIN, as discussed in the item above, directly into the landing page of the Web Console. The security model remains intact as credentials will still be required, but upon entering credentials, the Master user will be brought directly to the associated desktop.

Gateway Server Component as a Native 64-bit (x64) Application

Improved capacity for the PC-Duo Gateway server component for Hosts reporting from the internet. Along with Windows 64-bit Operating Systems, increased addressable memory relaxes capacity restrictions, allowing up to 2500 reverse connections from Hosts – (a 25% increase).

Macintosh File and Folder Transfer via Clipboard

The Host and Master for Macintosh now support file transfer using the clipboard. This includes single file, group of files, and folders with recursive transfer. This functionality works both from Macintosh to Macintosh as well as between Macintosh and Windows operating systems.

Remote Management Service Improvements

Performance and reliability improvements have been made in the Remote Management feature of the connection window with special attention to, and a drastic improvement in, the speed of the “Software Manager -> Installed Products” node.

In-Browser Connection Window Allows Easy Launch of the Full Client

A new button on the In-Browser (HTML5) connection window allows an easy switch to the full client, ClickOnce or installed Master, when available.

Improved and Streamlined Experience for Launching Master and Host on Mac and iOS

Both Mac machines and iOS devices now make the process of launching Master and Host simpler. Previously, the web application prompted to ensure required helper apps were installed before trying to launch them. In v13.3, a newly designed web page automatically launches the apps if they're already installed and provides instructions on how to get them (by download or AppStore) they're not yet installed.

Ability to Hide Unused Window Tabs in Installed Master

We have reintroduced the ability to configure the installed Master UI to hide the window tabs that are not in use by that installation.

Integration of the latest OpenSSL Library Series (v1.1.1)

To keep up with the latest security trends, the OpenSSL Library integrated with PC-Duo is now the v1.1.1 series as of this release.

Dynamic Station Name Resolution

Hosts that are configured to use Dynamic Station Name Macros will now display the evaluated name in their Host Control Panel or settings, depending upon the Host. This is helpful in order to know what the Master user should expect to see for the reported Host Station Name.

Easy Scroll to Navigate Viewing Larger Desktops

Easily scroll across desktops larger than the Master connection window by simply holding either of the SHIFT keys and moving the pointer to any edge of the screen. This is available in both the Installed and ClickOnce Master for Windows as well as the Master for Mac.

Send Clipboard as Keystrokes to Login Screen

Master for Windows, ClickOnce Master, and Master for Mac now support "Send Clipboard as Keystrokes" function. This takes plain text on the clipboard and types the corresponding characters, which is useful for entering credentials in places where the clipboard functionality is not available, e.g. the Windows logon screen.

Responsive Web Console Landing Page

The landing page of the Web Console will now display cleanly on various screen sizes for phone, desktop and iPad.

What's New in V13.2: Main Changes

Host Console Watermark and Border Options to Show Connection

This version of the Host now supports additional options for alerting a console user when a remote control session starts or is active. These settings are configured in the Host Control Panel and include the ability to show a border around the screen being captured (all monitors) and/or a translucent watermark that displays the connected user, also on all monitors. Note that this is in addition to the previous alert features including Popup Notifications, Beep, etc.

Ability to Launch the Installed Master from the Web Console

The installed Master connection window can now be launched when clicking on a Host name in the Web Console. This is in addition to the "Connect in Browser" and ClickOnce options and is available on the Windows platform. This capability is available for both live remote control sessions as well as playback of recorded sessions.

New Utility to Allow Host Settings Updates Through a Gateway

The new Host Updater Utility is a long-running desktop application that connects to a Gateway and allows an administrator to automatically apply a set of Host settings updates in JSON format to all Hosts that are in communication with that Gateway, regardless of whether they are on the LAN or in the same domain. (This is in contrast to the Deployment Tool, which only works peer-to-peer with Hosts that are on the LAN). This new utility is installed alongside the Deployment Tool via the DeploymentTool.msi installation package.

New Gateway Host Grouping Rule (by Active Directory Computer Membership in Security Groups)

PC-Duo v13.0 supports automatically organizing Hosts in the Gateway Server by Active Directory "organizational unit" hierarchy. Version 13.2 extends this functionality to include a new type of Host Grouping Rule "AD Security Membership". This new rule is similar to the existing "Active Directory" rule (which is now renamed to "AD Organizational Unit"). However, instead of placing the Host in a group named for the one OU which contains the Host computer, the Host is placed in one group for each of the possibly many AD security Groups of which the Host computer is a member.

Ability to Have HOD Report to Multiple Gateway Servers

To meet certain availability and redundancy requirements, PC-Duo will allow a downloaded HOD to report to multiple PC-Duo Server installations. The first set will always be the Server installation the HOD was downloaded from while alternate/additional Servers can be configured by an administrator.

Host Settings JSON Representation Improvements

The PhSetup command has supported exporting and importing Host Settings from and to a Host for several releases. This release introduces new functionality to make this easier. First, the Deployment Tool now lets you Export a Host Configuration to JSON, either by saving to a file or copying to the Clipboard. Second, PhAdmin now has a hidden button that lets you import a JSON file, which can be made visible either by holding down the Shift key when you start it up, or by using a new "/all" option on the command line. This is a good option meant for administrators of the Hosts.

What's New in V13: Main Changes

Version 13.0 marks the beginning of the 3rd generation of PC-Duo technology.

One-click (no install) HTML 5 remote control from mobile devices

PC-Duo v13 now provides one-click remote control capabilities from devices without the need to install a specific native application. The new HTML 5 viewer permits remote view and control of PC-Duo host computers directly from the browser, including browsers on mobile devices.

2-Factor Authentication

Until now, authentication had been limited to Windows Authentication. Version 13 allows us to break from that in order to use alternate identity providers and provide multi-factor authentication. The initial release will include support for talking directly to the Microsoft Azure Active Directory (AAD) tenant service.

Hierarchical Grouping

The Gateway now supports hierarchical groups. These groups will possess security inheritance, and Active Directory synchronization via Host Grouping rules (i.e. organizing Hosts workstations according to their location in AD).

Active Directory Synchronization

This feature allows for Hosts to be organized in the same way that they are organized in Active Directory. This is driven by enhancements to the Host Grouping rules feature and the addition of hierarchical groups.

Streamlined Server Installation

In version 13, installation of the server software is greatly simplified by providing a bundle installer. This allows all of the server-side components to be installed by running a single installation file. We guide the user step by step to ensure the components are configured correctly, actively guarding against many potential misconfigurations.

Decoupling of components

The Gateway Server, Web Console, and supporting SQL Server instance can now be installed on different machines. This specifically includes running against a SQL instance managed separately (perhaps a SQL Server high-availability cluster).

Migration to SQL database

All data is now kept and managed by Microsoft SQL Server. Use of the “Jet” database engine (MDB files) has been retired.

Server Configuration Check utility

This is a new standalone utility added to help diagnose and modify a server installation. It will examine the server system’s configuration and identify possible configuration errors. It also allows for easy changing of the DNS name, networking ports, and SSL certificate selections for the installation. This utility is conveniently accessible from the Windows Start menu.

Tighter integration between Gateway Server and Web Console

The Gateway companion service will no longer be necessary as Web Console and Gateway Server now communicate directly with each other.

All management functionality available in the Web Interface

The Web Console includes full administrative functionality, and the MMC-based Gateway Administrator has been retired.

Host on Demand for Windows as EXE Deployment

The Host on Demand can now be deployed as an executable download in all browsers, and no longer requires ClickOnce Deployment support. In browsers that support ClickOnce deployment, the Host on Demand is still deployed that way for an improved user experience.

Gateway Server “HTTPS” Transport Support

When Web Console and Gateway Server are installed on the same machine, the Gateway Server can now register with the Windows operating system “HTTP.SYS” driver and share the listening ports with the Web Console. This allows WSS-protocol connections (only) to be made to the Gateway Server on the port normally used to access Web Console (e.g. port 443), and in many configurations facilitates only having to open one port to the internet to allow access to all of Identity Manager, Web Console, and Gateway Server.

Reverse Web Proxy Support

PC-Duo Server now supports being placed behind a “reverse web proxy”. This is an appliance or other software product that terminates incoming HTTPS connections, and forwards them to the back-end service (PC-Duo Server).

Macintosh and iOS Master Enhancements

The Master for Macintosh and Master for iOS now have full authentication support, and can handle all authentication scenarios both on initial connection and when connecting to items from the “Recent Hosts” or “Recent Recordings” lists. (Previously, configurations that required a web-based login, like Azure Active Directory, did not work from the “Recent” lists.)

Macintosh software is supported on OS X 10.9 (Mavericks) and later, including the recently released 10.14 (Mojave). iOS software is supported on iOS v9 and later, including the recently released iOS v12.

What's New in V13: UI Functionality, Performance, Usability

Refreshed UI

Both installed components and the Web UI have an updated look and feel.

Optimized Scrolling

Version 13 Masters connecting to version 13 Hosts have an optimization that greatly improves vertical scrolling.

Improved High DPI and Scaling Support

Host v13.0 automatically "scales down" a high DPI screen to reduce the amount of data sent to the Master, and to let the Master have a reasonable "Fit 1-to-1" view. Master has performance improvements in rendering the Host screen, especially in the case of "Fit-to-Window".

Clipboard Transfer Improvements

Master v13 on Windows connected to Host v13 on Windows has enhanced Clipboard Transfer support, including the ability to transfer files and folders (e.g. via Windows Explorer), and to drag-and-drop files from the Master desktop onto the Master Connection Window to initiate a clipboard transfer operation to the remote Host.

Recording Retention Guard

Recordings can be created on demand or by policy (Auto-Recording feature), and may need to be preserved indefinitely by some customers in order to meet certain compliance requirements. The Gateway can now be configured to prevent the deletion of recording either by automatic controls, such as age settings, or by manual attempts. This includes archiving recordings of Hosts that are deleted from the Gateway to a new item, "Recordings of Deleted Hosts" in the "System" Gateway group.

Web Console: Usability and Functionality Improvements

Improvements across many pages of the Web Console. Session state now remembers group selection when navigating back to the Hosts page or upon Refresh. V13 provides easier access to key information across pages, with more reliable and flexible sorting of data.

New Setting: Allow access to Find a Desktop from External Addresses

This new setting, which is "on" by default, can be turned "off" to disallow any attempt to connect as an authenticated client to the Identity Manager, Web Console, or Gateway Server. In this configuration, the system can be exposed to the internet and the only functionality available to external users is "Share my Desktop" (i.e., Host on Demand).

Remote PrxSysInfo generation

Ability to generate PC-Duo System Information reports (prxsinfo) remotely. An administrator can now remotely request their respective servers, Host and Gateway, to initiate PrxSysInfo reports, and the results of those reports will be transmitted to the client for viewing and storage.

What's New in V13.4: Fixes and Minor Enhancements

- **File Transfer Navigation Tree Improvement:** The File Transfer tab will now include the "Downloads" folder and "Shared Desktop" shortcuts for the current %Userprofile% in the navigation tree. These folders will show up for both the local and remote machines providing a console user is logged in.

- Reliable Master Toolbar Representation of Available options: The Host and Master have been updated with a new protocol so that the Master will be able to accurately determine if Manage Visual Effects, Input Suppression, and Screen Blanking are supported on the remote Host. This provides confidence that the selected actions will be enforced at the remote Host as requested. These items are disabled if the features are not available on the connected Host. When selected, the items automatically unselect themselves if the operation is not available at this time.

What's New in V13.3 Hotfix #5: Fixes and Minor Enhancements

- An issue that could cause Analytics data to not be available for reporting has been found and fixed. Under rare circumstances, the transformation of basic audit data into the reportable version seen in the Analytics tabs could fail because of a timeout due to long processing times. The Gateway Server, which controls this process, now has a much longer timeout, and processes the data in chunks, to prevent this from happening. Any systems with a backlog of data will self-heal after an upgrade to this release.
- Powershell scripting operations to configure the PC-Duo Server could fail due to a time out under limited circumstances. The timeout limit has been increased in this release to avoid this problem.
- The "DbInstallerCmd" utility is used to update the database from an earlier release to the latest version and is normally run automatically by the Server Products installer. This utility has a new command line switch "/nobackup" to suppress the automatic backup that normally runs (when there is a schema version update). Manually running this command, with this switch, is recommended in environments that have a large database and a strong backup policy.
- The Server Configuration Check utility utility did not handle machine-local Gateway Server service accounts correctly when trying to select an SSL certificate, causing the selection for the Gateway Server (but not IIS) to fail. This is now fixed.
- Gateway Settings > Auditing > "Automatically delete log files older than" minimum setting value has been updated. Previously, this could be set as low as 1 day; the new minimum is 31 days. The installation default value is 40 days, so most installations are not affected by this change. If a setting value of less than 31 is in effect before upgrade, it will be changed to 31 days during the upgrade.

What's New in V13.3 Hotfix #4: Fixes and Minor Enhancements

- Version number is fixed; previous v13.3 releases were incorrectly marked "v13.2"; build number is guaranteed to uniquely identify the releases.
- Important fixes in the Gateway Server address scenarios where Host would be listed as an "OK" status when the system should have known that was not correct (e.g. Host should be marked "Offline" or

“Unreachable”). Note that one issue affecting Hosts with reverse connections was introduced in v13.3 Hotfix#3, but there are other scenarios and fixes in this area from earlier releases.

- Several important reliability fixes are included in the Host component. Although the issues rarely occur, it's recommended that Hosts be upgraded where possible to avoid these issues.
 - Host deadlock at exit makes service uncontrollable and cannot stop.
 - Host clipboard cache confusion results in Host being stuck in “Host in Use” state after connection ends.
 - Host Service power management notification handling improved so that Host is able to report shutdown consistently, allowing Gateway Server to mark the Host as “Offline”; previously, some machines with Windows 8 (or later) “Fast Startup” power management mode enabled were not reporting, resulting in an “Unreachable” or other status.
- Gateway Server “Wake on LAN” functionality enhanced to send an additional wake packet to the /24 subnet broadcast address of the Host. This is in addition to the last known IP address, and the general broadcast address 255.255.255.255. For example, a wake request to address 192.168.1.47 previously sent packets to 192.168.1.47 and 255.255.255.255; now, an additional packet is sent to 192.168.1.255 (the IPv4 address with the last octet set to 255).
- Web Console HTML5 “Connect in Browser” client fixes client-side performance issue.
- Web Console > Accounts > Gateway Identities view, Export data, now includes each user's last login time.
- Host on Demand for Windows now provides expected elevation prompts if the console user is a member of the local “Power Users” group.
- Host for iOS and Host for Android have been updated in their respective App Stores. As of this writing, current version is v10.3.3889. New features include:
 - Support for device-wide “Dark mode” display option
 - Sleep management – options to keep device awake while connection is active
 - Other minor user interface improvements
 - Support for Mobile Device Management (MDM) deployment and configuration
 - Web proxy support for Android devices (previously available on iOS)
 - Additional options under Settings for extension tags
 - Ability to more easily configure diagnostic logging, and share the logging if you experience issues
- All PC-Duo installers have Property value “ALLUSERS”=1, which resolves a compatibility issue with deploying the software via Microsoft InTune.
- Latest OpenSSL release (v1.1.1i) incorporated into product.

What's New in V13.3 Hotfix #3: Fixes and Minor Enhancements

- Several important reliability fixes are included in the Web Console and Gateway Server components. Although the issues rarely occur, and may not occur in all environments, it's recommended that all PC-Duo Server installations be upgraded to this release to avoid these issues.
 - A Gateway Server crash due to an error in Host status processing was fixed. This could happen only in a small window if the connection failed after it was established but before the Gateway read the Host status.
 - A transport-level crash due to improper error handling was fixed. This could impact either Host or Gateway, and occurred if an inbound connection was established, and the initial protocol negotiation occurs, but then client fails to send expected data within a timeout period.
 - A memory leak in the Web Console could occur if the HTML5 Remote Control feature was used and the Gateway Server internal access was using the TCP, WS, or SSL protocols (and not WSS).
- Gateway Server system host "Performance Monitor" now reports on Identity Manager and Web Console process statistics, if those processes are on the same machine as the Gateway Server.
- ServerConfigCheck utility now reports on Identity Manager discovery document problems with much more accurate and useful information; previously, most problems would be (possibly incorrectly) reported as HTTP 503 (service not available).
- Web Console Analytics > Services page showed station name plus machine name (if these are different) in this view, but only allowed search on station name. Elsewhere in the product, the station name (only) is shown. The machine name was removed from the Services view for consistency and to avoid confusion with searching.
- Web Console's Host context menu options "Connect via [Client] for View Only" was not properly handling the "view only" request and the helper application would take input control on connection. This impacted "Connect via ClickOnce for View Only" and "Connect via Installed Master for View Only" on Windows, and "Connect via Helper for View Only" on Macintosh.
- Web Console > Gateway > Gateway Settings > Grouping Rules > IPv4 Grouping Rule was previously limited to a range of 4096 addresses per rule. This has been relaxed and ranges up to 16777215 are now permitted.
- Installed Master did not dismiss the automatic reconnect dialog if remote control was reconnected, but one of the other services could not be connected-to. This specifically happened with Gateway-based connections where the Master user did not have the right to access the Chat service.
- The HostPrep utility (used to prepare a Host installation on a system that is being "sysprep"ed for duplication or imaging) did not work correctly in any v10.x release, and the result was that Host settings could not be established in the base image and preserved across the Windows "sysprep" operation.

- Host for Transient VDI-type Hosts were not generating new or unique Host PIN values, so all VDI instances from the same image had the same Host PIN.
- An issue with remote controlling a Host machine that in turn runs the Hyper-V Manager Virtual Machine Connection (VMC) window to remote control a Hyper-V virtual machine has been fixed. The behavior is that shifted characters, e.g. symbols type by using SHIFT and a number key, were not reliably being injected into the virtual machine. PC-Duo Host now works around this issue with the VMC application to ensure these characters are entered correctly. If you experience this issue, you must upgrade the PC-Duo Host on the machine running VMC to get the fixed behaviour.

What's New in V13.3 Hotfix #2: Fixes and Minor Enhancements

- Master for Macintosh now has full support for Hosts with multiple monitors, with features comparable to the Master for Windows. Specifically, the "Select Host Monitor" menu and the "Next Host Monitor" button are on the toolbar and in the menus. Master for Macintosh also now supports autoscroll of the Host view when in Fit 1-to-1 mode by holding the SHIFT key while moving or dragging the mouse.
- Remote Control clients now have "Next Host Monitor" button on toolbar. When remote controlling a Host with multiple monitors, in addition to the previous features to select single monitors to view, a new toolbar button "Next Host Monitor" is available to cycle through the monitors more conveniently. This is available in Master for Windows, Master for Macintosh, and in the HTML5 Remote Control page in Web Console. Additionally, the keyboard accelerator Ctrl+] activates the "Next Host Monitor" feature, and keyboard accelerator Ctrl+[toggles Fit-to-Window mode. These accelerators work in Master for Windows and Master for Macintosh.
- The Host for Android is now supported on ChromeOS Chromebooks that support running Android applications. This allows a Web Console user to view the screen of the Chromebook when it is shared.
- The Host handling of SSL certificate errors when configured to report to a Gateway Server has been updated. Previously, the option to accept an untrusted certificate was conditional on the specific error that was reported. Because the error could change, this was not a completely predictable configuration option. In this release, the option to accept a particular certificate ties that acceptance to the specific certificate, independent of what the error is. This makes this functionality more predictable, and has been implemented consistently on all PC-Duo Host platforms – Windows, Macintosh, iOS, and Android.
- Identity Manager setting "Require Azure AD for interactive web-based logins". This configuration option is designed to accommodate a specific configuration, where Windows Accounts are to be used by SDK clients (including custom applications written against the SDK, as well as the Master), but all web-based logins should require Azure AD and not provide the choice of entering a Windows account. This streamlines single sign-on using Azure AD for browser-based client activity, without disabling Windows Accounts for other usages.

- The Server Configuration Check utility (in the PC-Duo Server installation) now performs additional checks and warns on configuration issues that were not previously detected. Specifically, the IIS Application Pools for Web Console and Identity Manager are started if they're not running, and a warning is issued if they cannot be started. The utility also checks that the Application Pools and Gateway Server are configured to run as the account specified at installation time.
- The System Information reporting tool now reports on some additional data to help diagnose problems. More information about the machine's relationship to its Windows domain, including whether that relationship seems to be working, is reported. The total size and free disk space of each drive is also reported, to help identify low disk space issues.
- The "text mode" screen used by the PC-Duo Server "System" Hosts (Gateway At-a-Glance and Gateway Server Performance) were not drawn with the correct colors by the HTML5 Remote Control client or the Master for Macintosh. This is now fixed.

What's New in V13.3 Hotfix #1: Fixes and Minor Enhancements

- New feature: HTML5 Remote Control clipboard support now supports placing a selected file (uploaded from the client browser) onto the Host clipboard; this file can then be Pasted on the Host into the file system. This feature provides a basic file transfer capability (from Master to Host only) within the HTML5 Remote Control experience. This works with all Hosts that support file objects on the clipboard (both Windows and Macintosh), up to a file size of 28 megabytes.
- Web Console now correctly detects the "ClickOnce Deployment" ready state of all browsers on Windows to correctly choose when to use ClickOnce Deployment of the helper applications. Previously, some scenarios in Web Console, and some browser configurations, were not properly detected.
- A resource leak in Web Console in the HTML5 Remote Control component could cause the process to run out of address space and stop accepting new logins with error 0xC004C056; this has been fixed.
- A regression bug in installed Master on Windows prevented the Gateway Hosts tab, Hosts listview, from preserving user customizations (changes in column order, changes in column width, which column to sort by, etc.) when a new Gateway Server was connected to, or when the existing connection was refreshed.
- A transport-layer issue could cause TCP connections to take up to 30 seconds to close; this most commonly impacted the Master Connection Window closing a Peer-to-Peer connection to a Host via TCP.
- The Web Console "Host Settings" feature now reliably prompts for end-to-end credentials; previously, an incorrect error code may have prevented the prompt from appearing.

- Deployment Tool “Export Settings to JSON File” was not exporting the Installation Files list; this meant that exporting the settings and importing them for another user, or on another machine, did not restore this state. This is now fixed and these settings are exported (and later imported) correctly.
- Several Host station name macros (including USERUPN, USERDISPLAY, and USEREMAIL) depend on lookups from Active Directory. If the user logs in when a domain controller is inaccessible, these values cannot be retrieved, however, when a DC becomes available later (e.g. if user gets on a VPN to the corporate network), the Host did not update them. The Host now attempts to refresh this information when there is a network address list change (e.g. changing networks or joining/leaving a VPN).
- Host for Macintosh and Master for Macintosh are now “sleep aware” and respond promptly when the Macintosh sleeps or wakes up, restoring connections much quicker than previous releases.

What’s New in V13.3: Fixes and Minor Enhancements

- Server installation default protocol for external access to the Gateway Server is now set to WSS port 443; previously this was TCP port 2303, and that’s not commonly exposed to the internet. This is an installation default change only; no settings are changed on upgrade.
- The Host back-off policy has been modified to distribute reconnection attempts after a Gateway Server restart better. This results in faster recovery of Host control connections to provide connectivity to all Hosts. Note that upgrading Hosts is required to gain this improvement.
- Web Console Group Security Editor had a regression error introduced in v13.2 HF#2 that is now fixed; the ability to change security to apply to “This group only” or “This group and subgroups” was impacted.
- PC-Duo System Information report (prxsinfo) has several improvements in information collected, including information about SSL certificates selected in IIS and available in the local machine store.
- The PC-Duo Server Products installer (aka Bundle installer) upgrades the ODBC Driver 17 from the originally redistributed version v17.1.0.1 to v17.5.2.1. A bug in the original package from Microsoft requires that the component be repaired after upgrade; this is handled automatically by the installer.
- If the Master requests the Host suppress the local keyboard and mouse, or manage visual effects, whether those things happen or not are controlled by whether the Host supports those features, and the Host settings. If the requested function is not done, the button or menu item in the Master should change to reflect that state. Previously, not all Master platforms handled this correctly; specifically, Master for Mac and Master for iOS now correctly show the proper state, and Host for Mac correctly reports that it cannot perform these functions.
- Host and Master for Macintosh are now notarized by Apple; this provides an assurance when installing in newer versions of macOS. Host for Macintosh now preflights screen capture and input control access, which guides the user to provide the necessary access in system Preferences.

What's New in V13.2 Hotfix #3: Fixes and Minor Enhancements

- The PC-Duo Identity Manager has been updated to be compatible with Google Chrome version 80, which changes the handling of some cookies. This update is required in order to ensure that PC-Duo integration with Azure Active Directory works correctly; it's strongly recommended in all cases. See the blog post <https://web.dev/samesite-cookies-explained/> for more information about this change in Chrome.
- Host and Master installers no longer default to installing the optional "Remote Printing Support" component. If Remote Printing support is desired, this optional component should be selected during an interactive installation of Host or Master or enabled via the MSIEXEC command line option "INSTALLLEVEL=100" (this works the same for both Host and Master installers). Note well this only changes the default for new installations; upgrades will update the Remote Printing component if it was previously installed, or leave it uninstalled if it was not installed.
- Gateway Server issue that could cause the Web Console "Activity" views to be inaccurate is resolved. The issue only occurred if, while the Gateway Server is operating, the SQL Server database becomes unavailable, and then becomes available again. In this case, updates to the "active" objects (connections, host activity, recording activity, etc.) could have been lost, resulting in "stuck" activity items. Note that these were always cleaned up when Gateway Server restarts, so there's no persistent errors, but the Activity views were not perfectly reliable when this issue occurred.

What's New in V13.2 Hotfix #2: Fixes and Minor Enhancements

- OpenSSL has been updated from the v1.0.2 series to the v1.1.1 series. This release includes OpenSSL v1.1.1c, and restricts the default ciphers used to be higher quality/more secure than previous PC-Duo versions, while maintaining backward with all PC-Duo versions that supported TLS v1.2. Additionally, TLSv1.3 is now supported in the Host and Master for Windows, Gateway Server, and ClickOnce Connection Window for Windows. Further support for TLSv1.3 will depend on operating system support in Windows (for Web Console, via IIS) and on Macintosh and iOS. Elliptic Curve Cryptography (ECC) certificates are also now supported by the Gateway Server and Gateway Server Certificate Manager.
- Deployment Tool "Export Settings to JSON File" functionality has not been working since v13.2, and is fixed in this release. Additionally, the Deployment Tool was not registered as an MMC snapin correctly, so that it did not appear in the "Add/Remove SnapIn..." list.
- Several installed Master issues are addressed in this release, including:
 - Installed Master v10 connecting to GWS v9 as a master-category user now works correctly
 - Master inactivity prompt no longer appears if Master Control Panel window does not have focus; this keeps that popup from interrupting ongoing work in a Connection Window.
 - Master Gateway Groups dropdown list now sorts items correctly even if user does not have access to top-level group(s).
- Gateway Server has a number of reliability and "edge case" processing fixes, primarily around Host status update processing. While the issues addressed generally only occur in unusual or uncommon situations,

customers with installations involving either a large number of Hosts, or relatively large numbers of Host reverse connections, or that use Host for Macintosh, are advised to upgrade to this release to ensure the most reliable operations.

What's New in V13.2 Hotfix #1: Fixes and Minor Enhancements

- Deployment Tool allowed the new "Watermark" settings to be configured, but did not include this setting when creating a Windows Installer Transform (MST) file.
- The new Web Console feature to launch the installed Master as the default connection experience was not remembering and using that setting if the browser was not Click-Once Deployment enabled.
- Additional information is included in the System Information report to facilitate diagnosing certain kinds of problems.

What's New in V13.2: Fixes and Minor Enhancements

- The "Suppress Input" feature of the Host was not working in v13.0. This feature is disallowed by default (in Host Control Panel, Options tab, Keyboard and Mouse Suppression), but when allowed, input suppression was not happening. This is fixed in this release.
- The ability of the Gateway Server to restrict a Master user to only File Transfer Read or File Transfer Write access to a Host was not working correctly in Host v13.0; the Master user was incorrectly given both File Transfer Read and File Transfer Write access. This only is an issue if users are in the Gateway Server security model as having only one of the two File Transfer rights, and this issue does not affect any other Host services or access rights.
- The Gateway Server incorrectly created two Audit log events with ID=209 for each closed reverse connection. This problem was introduced in v12.7 hotfix#6 and exists in all releases until now. This simply resulted in a redundant entry in the AuditLogs*.CSV files, and had no material impact on anything.
- A few regression issues in the installed Master v13.0 (versus installed Master v12.7 and earlier) were found and fixed. Specifically:
 - Having a pipe character (|) in the Host station name caused peer-to-peer connection attempts to fail with error 0xC004C001 (Host not found).
 - Connection Window window automatic resizing logic was not working for text-mode Hosts (like the Gateway Server "System" group Hosts).
 - The "Send Keystroke" menu on the full screen toolbar, when connected to a Host for Macintosh, did not reflect the Macintosh shortcuts, whereas the Send Keystroke menu on the main toolbar did.

What's New in V13.0: Fixes and Minor Enhancements

- This release contains an updated release of the Deployment Tool. Installation of this tool will upgrade v12.7 and earlier versions while preserving the relevant/supported state. This resolves the issues around creating and applying configurations for the Master component.
- The database used by PC-Duo Server (normally named RemoteControlGatewayDb, although this name may have been changed/configured at original install time) is now automatically backed up before performing a database upgrade. The backup is performed with the T-SQL "BACKUP DATABASE" command to the default location for backups configured in SQL Server. The file name for the backup is the database name, the text "_beforeupgrade_schema_", and the internal schema number of the database being backed up. In a default installation, upgrading from v13.0 to hotfix#1 results in a backup file "RemoteControlGatewayDb_beforeupgrade_schema_1303580.bak". Note that once the database is backed up and upgraded, other install/uninstall operations will not create additional backups.
- Improved forward web proxy support for clients and Host, when using the WS and WSS protocols. Forward web proxy support now looks for:
 - PC-Duo-specific registry overrides to control and configure the behavior, including the ability to turn auto-discovery of proxy configuration off and omitting all web proxy support. For more information about this configuration, please contact technical support.
 - For client software running as a logged-in user in Windows (e.g., Master), use the system per-user proxy configuration (in Internet Explorer > Internet Options, or system Control Panel > Internet Options, or Windows 10 Settings > Network > PC-Duo). If the auto detection flag is set, the operating system's WPAD support is used to automatically detect the proxy configuration.
 - For both client software, and the Host service, the system-wide proxy configuration set via the "netsh winhttp set proxy" command is read, and used if set. Note that these settings do not provide auto-configuration, but can provide an explicit proxy configuration.
 - If no instructions regarding web proxy have been found, auto-detection using the WPAD support is tried. Note that because auto-detection can be a time-consuming process, a direct connection (without proxy) is attempted while the web proxy configuration is detected. If the direct connection fails, and a web proxy configuration is discovered, the connection is automatically retried through the web proxy.
- Installers now fully support TLSv1.2-only environments. Previously, the software could run in this environment, but TLSv1.0 and TLSv1.1 had to be enabled to install or update the software.
- Installed Host reliably allows the Master to have input control of the Host machine. Previously, plug-and-play operations (e.g. unplugging a mouse or keyboard, or starting up without an attached mouse or keyboard) could cause the Host to lose the ability to inject input into the system.
- Web Console now recognizes and supports additional extensions for Chrome that provide Click-Once Deployment support.

- Gateway Server –
 - now has more robust computation of SPN name for Kerberos authentication to Hosts; this specifically helps in environments with multiple trusted domains.
 - has many improvements in reliability, supportability, and performance of Host status processing.
 - may fail to stop in a timely fashion when the Server Control Manager requests it to stop, and a crash-at-exit behavior has been fixed.
- Better handling of transparent/invisible cursor shapes has been implemented. Master now treats invisible pointer as equivalent to “null” pointer, so “show local cursor if Host cursor is missing or hidden” option works.
- Host Manage Visual Effects (MVE) feature is more reliable, should restore wallpaper correctly, and manages ClearType setting explicitly.
- Using PhSetup to repeatedly add security to Host configuration no longer creates duplicate entries.
- Master cycling monitor window is now always view-only and cannot take input control.

Operating System Requirements

PC-Duo v13.4 Host, Master, and other client components are supported on all Windows operating systems currently in support by Microsoft:

- Windows 8.1, Windows 10
- Server 2012, Server 2012r2, Server 2016, Server 2019

IMPORTANT NOTE: While the PC-Duo v13.3 was not officially supported on earlier Windows operating systems, no changes were made in that release to prevent the software from being used there. In PC-Duo v14.4 release, the installers now block installation on unsupported versions of Windows, and the software will not run on those OSes.

The PC-Duo Server (Identity Manager, Web Console, and Gateway Server) require Windows Server 2012, Server 2012r2, Server 2016, or Server 2019.

PC-Duo for Macintosh now requires Macintosh OS X v10.9 (Mavericks) or later. Earlier versions of OS X do not support TLS v1.2 and therefore cannot communicate with PC-Duo v13.0 or later.

Compatibility

The PC-Duo Server can manage a variety of Host software versions in your environment. Due to restrictions to ensure reliable, secure encryption is always used, not all previous Host software versions are compatible with version 13. The minimum supported Host version is v11.6, although the latest release/hotfix version of the major version you're running is recommended.

In addition, because SSL support has been restricted to TLSv1.2 or later only in version 13, the following Host versions are required in order to connect to the Gateway Server v13 with the SSL or WSS protocols

- V12.1 build 2060 hotfix#4 or later (released February 2015)
- V12.5 or later (released May 2014)
- V12.7 original release or later (released June 2015)
- v13.0 original release or any later major or minor version

Furthermore, due to a bug in earlier versions of PC-Duo WSS protocol support, not all Host versions that support TLSv1.2 and WSS can be managed successfully when they report via WSS to the HTTPS port(s) introduced in v13.0. Incompatible Hosts will perform status reporting correctly, but cannot be connected to for services. The following Host versions are fully compatible with Gateway Server v13.0 HTTPS support:

- Host v13.0 original release or later
- Host v12.7 hotfix#8 or later (released August 2018)
- At the time of writing, no Host v12.6 is compatible (through hotfix#6), and there are no plans to provide this support in the v12.6 series.

Note on upgrading to this release:

The server-side components cannot be upgraded automatically from v12.7 or earlier releases. All other product components, including Host and Master, support upgrading from previous releases.

Documentation

Documentation is available at:

- The “PC-Duo Server Installation Guide” is a PDF included in the On-Demand Edition download (zip file)
- PC-Duo Web Console Operations Guide
<https://www.vector-networks.com/pcduo-docs/v13/wc/>
- PC-Duo Host Guide
<https://www.vector-networks.com/pcduo-docs/v13/host/>
- PC-Duo Master Guide
<https://www.vector-networks.com/pcduo-docs/v13/master/>
- PC-Duo Deployment Tool Guide
<https://www.vector-networks.com/pcduo-docs/v13/pdt/>

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This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>), cryptographic software written by Eric Young (eay@cryptsoft.com), and compression software from the ZLIB project (<http://www.zlib.net/>).