

Directory Sync Pro and Active Directory Pro 19.4

For Exchange and Active Directory Sync

Requirements and Installation Guide

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Section 1. Introduction

1.1 Purpose

This document details the following:

- Requirements for implementing Binary Tree's Directory Sync Pro and Active Directory Pro. These include the requirements for each of the servers needed to run Directory Sync Pro, as well as any environmental requirements.
- Information on how to install Binary Tree's Directory Sync Pro and Active Directory Pro.

1.2 Audience

This document assumes the reader has Active Directory and Exchange administration skills. If Active Directory or Exchange Administration topics mentioned in this document are not understood, please reference the product(s) System Administration documentation.

1.3 Certifications

- Directory Sync Pro has been certified to work with Active Directory Domain and Forest Functional Levels 2012 R2 and 2016.
- Active Directory Pro has been certified to work with Active Directory Domain and Forest Functional Level 2016.
- Directory Sync Pro and Active Directory Pro supports TLS 1.2 only connections.

Section 2. Directory Sync Pro Prerequisites

2.1 Supported Environments

The following is a list of supported and unsupported environments. If implementing directory synchronization between two Active Directory environments, you will need a Binary Tree Windows Server and an SQL Server database server.

	Supported	Not Supported
Binary Tree Windows Server	Windows Server 2012 R2, Windows Server 2016, or Windows Server 2019; US English Operating System	All other versions of Windows Server
SQL Server Database	<p>SQL Server can be a new or existing database server in the customer's environment. The following SQL Server versions (English versions) are supported:</p> <ul style="list-style-type: none"> • SQL Server 2008 R2 • SQL Server 2008 R2 Express with Advanced Services • SQL Server 2012 SP2 • SQL Server 2012 SP2 Express with Advanced Services • SQL Server 2014 • SQL Server 2014 Express with Advanced Services • SQL Server 2016 • SQL Server 2016 Express with Advanced Services • SQL Server 2017 • SQL Server 2017 Express with Advanced Services 	<p>SQL Server 2008 or previous</p> <p>Reporting using SQL Server Reporting Services 2016 or SQL Server Express Reporting Services 2016</p>
Domain	At least one Windows Server 2003 SP2 Domain Controller in Source and Target	

2.2 Binary Tree Windows Server Requirements

- .NET 4.6.1 or greater. The installer will install .NET 4.6.1 if the target machine does not already have it. All system patches, service packs, and security updates should be applied to your operating system to ensure compatibility with .NET 4.6.1.
- IPv4 Only
- The user running the BTDirsync service (full name BinaryTree.Coexistence.Dirsync.Exchange.exe) must have the following rights:
 1. Administrator rights to SQL Server with sysadmin role (during installation).
 2. Local administrative rights to the Binary Tree Windows server (during installation).
- Exchange cannot be installed on this server.
- The Binary Tree Windows Server must be a dedicated server for the Binary Tree solutions.

- If using the Password Copy functionality of Active Directory Pro Synchronization, PsExec must be installed in the Directory Sync Pro program directory (C:\Program Files\Binary Tree\DirSync). Ignore the PSTools Installation Guide concerning the proper installation location. PsExec is available at: <https://technet.microsoft.com/en-us/sysinternals/bb897553>

2.3 SQL Server Database Requirements

- The IP address and either the default SQL port (1433) or an alternate port must be open to all Binary Tree servers.
- The ability to create and modify tables in the Dirsync database on the SQL Server database server.
- It is strongly recommended that the SQL Server database server is dedicated to SQL Server. This server can host other SQL databases, but should serve no other purpose than being a SQL Server database server.
- SQL Server must be configured using Mixed Mode authentication.
- Using the default system administrator SQLServer login account is not recommended. A Directory Sync SQL Server login account should be created. This account must have sysadmin and database owner rights to create the Dirsync database. The sysadmin right can be removed from this account once the install is complete.
- If using a Remote Named Instance of SQL Server:

The incoming firewall rules on the machine that hosts the SQL Server instance must be modified.

Using the SQL default of dynamic ports for named instances:

1. Create an inbound firewall "Program" rule whose program path is the named SQL database engine (ex: %ProgramFiles%\Microsoft SQL Server\MSSQL14.<INSTANCE-NAME>\MSSQL\Binn\sqlservr.exe)
2. Create an inbound firewall "Port" rule for UDP port 1434.
3. The "SQL Server Browser" must be running.

Alternatively, you can setup a fixed port for the SQL instance following these [instructions](#).

2.4 General Requirements

- All components of Directory Sync Pro are fully functional on physical as well as virtual machines. When setting up Proof of Concept or Pilot environments, Binary Tree fully supports, in fact, recommends the use of virtual machines as a means of lowering the expense of such projects. However, when it comes to production environments, Binary Tree has not yet gathered sufficient information to determine whether virtual environments have the same stability and performance characteristics as physical machines. Because a majority of production environments have been and are deployed on physical machines, Binary Tree advises potential customers of these facts, but defers to them to make the final decision. Binary Tree will provide product support in both physical and virtual environments. However, if either stability or performance issues are found in a virtual environment, Binary Tree may recommend switching to a physical one as a means of issue correction.
- Binary Tree Servers must be connected via a LAN (10MB or higher) connection. A high-speed WAN (5MB or higher) connection may be acceptable, but is not recommended. Where possible, it is recommended to have these servers, as well as Exchange on the same physical network.

2.5 Exchange Access Requirements

To deploy Directory Sync Pro on the Binary Tree Windows Server, an AD account with Server Administration rights must be able to log on to the server interactively. The account must be able to run programs with Administration-level access on the target Exchange Server and specifically be able to open the Exchange Management Shell (PowerShell).

Binary Tree recommends the following setup for the service account:

Active Directory

- Minimum membership of Domain Users (least privilege) built-in security group
- Read & List Contents rights to "Deleted Objects" container. You may follow these steps if your account is not a Domain Administrator or equivalent (see KB892806):

Using a domain admin account, open a command prompt and confirm the successful execution of the following commands:

```
dsacl "CN=Deleted Objects,DC=domain,DC=com" /takeownership
```

```
dsacl "CN=Deleted Objects,DC=domain,DC=com" /g Domain\ServiceAccount:LCRP
```

- Full Control rights to destination OU in Active Directory

Exchange

- Administrative rights to Exchange

SQL Server

- Create a new login in the SQL Server Management Studio. In Server Roles, grant public and sysadmin rights (you may remove these rights after the **database** has been created). In User Mapping, select the Dirsync database and grant public and database owner rights.

Binary Tree Windows Server

- Member of local administrators group

2.6 Post Sync PowerShell Script Requirements

The following requirements must be met if using the Post Sync PowerShell Script option:

- PowerShell 4
- The credentials specified on the AD Target tab must have rights to run PowerShell.
- The following must be enabled on the DC defined on the AD Target tab:
 - Remote PowerShell commands (Unrestricted methods must be enabled if required)
 - Windows Remote Management (WinRM)
 - Active Directory Web Services

Section 3. Directory Sync Pro Advanced Network Requirements

3.1 Directory Sync Pro to SQL Server Access

Source	Target	Ports	Protocol
Directory Sync Pro	SQL Server holding the primary database	1433	TCP & UDP
Directory Sync Pro	SQL Server holding the logging database	1433	TCP & UDP

3.2 Directory Sync Pro Profile Specific Scenario Requirements

Directory Sync Pro Match Only or Update Only Profile (no object creation)

Source	Target	Ports	Protocol
Directory Sync Pro	Source Domain controllers	88, 389, 445*, 3268	TCP (all) UDP (88, 389)
Directory Sync Pro	Target Domain controllers	88, 389, 445, 3268	TCP (all) UDP (88, 389)

* Port 445 only needs to be open to the Source Domain Controller during Directory Sync Pro Profile creation

Directory Sync Pro Profile with Create Only or Create/Update Matching Option

Source	Target	Ports	Protocol
Directory Sync Pro	Source Domain controllers	88, 389, 445*, 3268	TCP (all) UDP (88, 389)
Directory Sync Pro	Target Domain controllers	88, 139, 389, 445, 3268	TCP (all) UDP (88, 389)

* Port 445 only needs to be open to the Source Domain Controller during Directory Sync Pro Profile creation

Directory Sync Pro Profile with Synchronize Passwords selected

Source	Target	Ports	Protocol
Directory Sync Pro	Source or Target Domain controllers	88, 139, 389, 445, 3268	TCP (all) UDP (88, 389)

Directory Sync Pro Profile with SID History Synchronization selected

Source	Target	Ports	Protocol
Directory Sync Pro	Source or Target Domain controllers running Windows 2008 or newer	88, 135, 137, 139, 389, 445, 3268 and 49152-65535	TCP (all) UDP (88, 389)
Directory Sync Pro	Source or Target Domain controllers running Windows 2003	88, 135, 137, 139, 389, 445, 3268 and 1024-5000	TCP (all) UDP (88, 389)
Target GC	Source PDC	135, 138, 389, 445, 1027	TCP (all)

Section 4. Active Directory Pro Prerequisites

4.1 Active Directory Pro Basic Installation Requirements

The Active Directory Pro suite consists of Binary Tree's Active Directory Pro, which includes both the console and the Web service, and Directory Sync Pro software packages. Both packages will require access to Microsoft SQL Server. In most environments, all of these components will be installed on the same server.

Single Server Installation Requirements

Supported Operating Systems	<ul style="list-style-type: none"> Windows Server 2012 R2 Windows Server 2016 Windows Server 2019
SQL Server Requirements	<ul style="list-style-type: none"> SQL Server 2012 SP2 Express 64-bit, 2014, 2016, or 2017 SQL Server 2012 SP2 Express 64-bit Express is supported up to 5000 objects SQL Management Studio must be installed SQL must be configured to permit mixed authentication, and one local SQL authentication account must be created for Active Directory Pro and Directory Sync Pro to share.
Minimum Hardware Requirements	<ul style="list-style-type: none"> 2 CPU/vCPU 6GB RAM 10 GB disk space, inclusive of the SQL install requirements
Additional Components	<ul style="list-style-type: none"> If your server is not internet connected, you will be required to install the following components prior to installing Active Directory Pro: <ul style="list-style-type: none"> .NET Framework 4.5.2 or newer Visual C++ 2013 Redistributable – BOTH the x64 and x86 versions must be installed, regardless of the fact that the Windows Operating system is 64-bit

If you are planning to have a long-term co-existence (1 year+), we recommend using the following formula to determine if you should use a full edition of SQL Server with our products. This formula assumes High / Verbose logging turned on for all profiles = worst case scenario.

Formula: (Expected months of co-existence x Users) x Profiles = N

If calculated N >= 12000 then we recommend full edition of SQL Server.

- Low example: 3 months x 300 users x 1 profile = 900
- Medium example: 6 months x 1000 users x 2 profiles = 12000
- High example: 12 months x 3000 users x 5 profiles = 180,000
- Extreme example: 14 months x 6000 users x 7 profiles = 588,000

Multi-Server Installation Requirements

Active Directory Pro is scalable and supports segregating components and can be installed in a multi-server configuration to support larger or complex environments.

If required in larger installations, remote SQL Servers may be used for the primary database and the logging database. Additionally, the primary database and the logging database can be segregated onto separate SQL Server instances.

Each of the following roles/functions may be separated onto different servers as required in advanced configurations:

- Active Directory Pro Server Web Service
- Active Directory Pro Administrator Console
- Directory Sync Pro Software
- Directory Sync Pro Database
- Directory Sync Pro Logging Database

When installed independently, Binary Tree's components require the following resources:

Supported Operating Systems	<ul style="list-style-type: none"> • Windows Server 2012 R2 • Windows Server 2016 • Windows Server 2019
Active Directory Pro Split Role Minimum Hardware Requirements	<ul style="list-style-type: none"> • 1 CPU/vCPU • 2GB RAM • 1 GB disk space
Directory Sync Pro Hardware Requirements	<ul style="list-style-type: none"> • 2 CPU/vCPU • 4GB RAM • 5 GB disk space
SQL Server	<ul style="list-style-type: none"> • SQL Server 2012 SP2 Express 64-bit, 2014, 2016, or 2017 • SQL must be configured to permit mixed authentication, and one local SQL authentication account must be created for Active Directory Pro and Directory Sync Pro to share. • SQL Management Studio must be installed • Express editions of SQL Server are supported as long as the express installation includes SQL Management Studio
Additional Components	<ul style="list-style-type: none"> • If your server is not internet connected, you will be required to install the following components prior to installing Active Directory Pro: <ul style="list-style-type: none"> ○ .NET Framework 4.5.2 or newer ○ Visual C++ 2013 Redistributable – BOTH the x64 and x86 versions must be installed, regardless of the fact that the Windows Operating system is 64-bit

Report Server Requirements

SQL Server Requirements	<ul style="list-style-type: none"> • SQL Server 2008 R2, 2012 SP2, 2014, or 2017 • Configured for Native Mode • Review the <i>Installing and Configuring SQL Reporting Services</i> topic in the Active Directory Pro documentation for more information. • SQL Server Reporting Services 2016 or higher is not supported at this time. The reports included in this current release of Active Directory Pro are supported on SSRS 2012 and 2014.
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4.2 Workstation and Member Server System Requirements

Supported Operating Systems	<ul style="list-style-type: none"> Windows 7 SP1 Windows 10 Windows Server 2012 Windows Server 2012 R2 Windows Server 2016
PowerShell Requirements	<ul style="list-style-type: none"> All client operating systems must have at least PowerShell 2.0 installed. Please Note: Windows XP, Windows Vista, Windows 2003, and Windows 2008 do not natively contain PowerShell 2.0. It must be installed/deployed prior to installing the Active Directory Pro Agent.
.NET Framework Requirements	<ul style="list-style-type: none"> All operating systems (with the exception of Windows XP) must have .NET Framework 4.5.2 or newer installed. This will appear as ".NET 4.5.2 Extended" in the add/remove programs list. We will continue to support the use of .NET Framework (Full) 4.0 on Windows XP devices. The "client" installation of the .NET Framework (before 4.5) is not sufficient and must be upgraded to the full .NET Framework.

4.3 Admin Agent Device Requirements

Operating System Requirements	<ul style="list-style-type: none"> 64-bit operating systems only Windows PowerShell 4.0 WMF 4.0 support
Supported Operating Systems	<ul style="list-style-type: none"> Windows Server 2012 R2 Windows Server 2016
Additional Requirements	<ul style="list-style-type: none"> Port Requirement: 80, 443 Software Requirement: .NET Framework 4.5.2 PowerShell Active Directory Module (only required if you want to run PowerShell scripts against Active Directory).

4.4 Networking Requirements

Domain Controller Access

For most scenarios, Active Directory Pro requires access to at least one read/write domain controller running Windows 2003 SP2 or newer in each source and target Active Directory domain. For fault tolerance, Binary Tree recommends at least two domain controllers in each source and target domain.

If SID History will be synchronized, any domain controller listed in the Target DCs tab within a Directory Sync Pro profile will require access to the domain controller holding the PDC Emulator Active Directory FSMO role in the source. Keep in mind that even if the domain controller holding the PDC Emulator Active Directory FSMO role is not listed in the Source DCs tab, any SID History migration attempts will require a DC in the target to communicate with the PDC Emulator domain controller. For this reason, it is a best practice to ensure that all domain controllers specified on the Target DCs screen within a Directory Sync Pro profile have the appropriate networks access to communicate with the source domain controller holding the PDC Emulator Active Directory FSMO role before a SID History migration is attempted.

In limited scenarios, it is possible that Active Directory Pro will not be responsible for creating or updating any accounts in the source or the target domains. In this scenario, Active Directory Pro can be configured to communicate with Read Only Domain Controllers (RODCs).

Network/Firewall Requirements

Active Directory Pro requires the following network ports to enable full functionality:

Source	Target	Port/Protocol
Workstations and Member Servers	Active Directory Pro Server	443 (TCP) or 80 (TCP)
Active Directory Pro Server	Source and Target Domain Controllers running Windows Server 2003	135, 137, 389, 445, 1024-5000 (TCP) 389 (UDP)
Active Directory Pro Server	Source and Target Domain Controllers running Windows Server 2008 or newer	135, 137, 389, 445, 49152-65535 (TCP) 389 (UDP)
Target domain controllers listed in the Target DCs tab	Domain controller in the source environment holding the PDC Emulator Active Directory FSMO role	135, 137, 139, 389, 445, 3268 and 49152-65535 (TCP) 389 (UDP)

The following ports need to be opened between workstations/servers and writable domain controllers for a successful domain join operation:

Type of Traffic	Protocol and Port
DNS	TCP/UDP 53
Kerberos	TCP/UDP 88
EPM	TCP 135
NetLogon, NetBIOS Name Resolution	UDP 137
DFSN, NetLogon, NetBIOS Datagram Service	UDP 138
DFSN, NetBIOS Session Service, NetLogon	TCP 139
C-LDAP	TCP/UDP 389
DFS, LsaRpc, NbtSS, NetLogonR, SamR, SMB, SrvSvc	TCP/UDP 445
LDAP SSL	TCP 636
Random RPC	TCP 1024-5000
GC	TCP 3268
GC	TCP 3269
DFS-R	TCP 5722
Random RPC	TCP 49152-65535

4.5 SSL Certificate Requirements

Active Directory Pro does not require HTTPS (HTTP with SSL), and can operate using HTTP. However, Binary Tree strongly recommends implementing Active Directory Pro using HTTPS to secure communications between the devices to be migrated and the AD Migrator Server. In order to activate HTTPS on the IIS component in Windows, the Active Directory Pro system will require that a SSL certificate is present.

Binary Tree does not provide a SSL Certificate as part of the installation. For the most secure installation, Binary Tree recommends purchasing a SSL Certificate from a Windows supported 3rd party provider.

In scenarios where this is not possible, self-signed SSL Certificate can be generated in Windows following these directions: [https://technet.microsoft.com/en-us/library/cc753127\(v=ws.10\).aspx](https://technet.microsoft.com/en-us/library/cc753127(v=ws.10).aspx)

If using a self-signed certificate, it should be noted that Active Directory Pro's agent component would utilize the operating system's certificate trust list. Due to the security nature of Active Directory migrations, there is no method of implementing an override and forcing the agent to use an untrusted certificate. If a self-signed certificate is used, that certificate will need to be added to the trusted root certificate list for all computer objects to be migrated. This can be accomplished via group policy: [https://technet.microsoft.com/en-us/library/cc738131\(v=ws.10\).aspx](https://technet.microsoft.com/en-us/library/cc738131(v=ws.10).aspx)

4.6 Service Account Requirements

Active Directory Pro requires the following user account permissions and privileges to support Active Directory migrations:

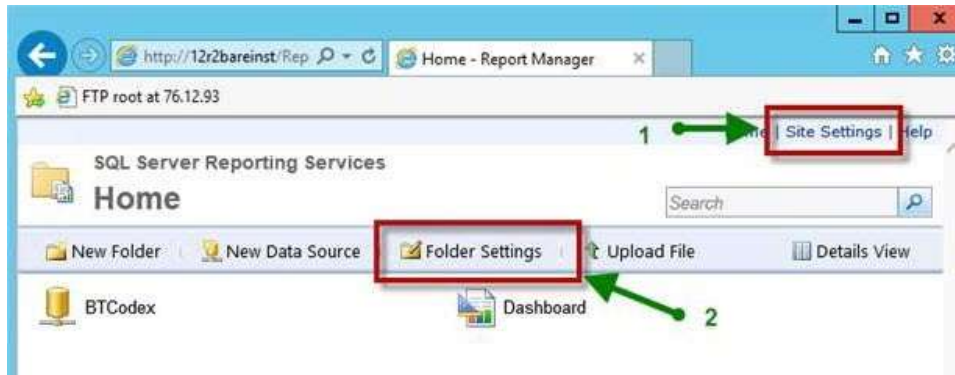
- One service account with read/write access to all organizational units (OUs) containing user, group, and computer objects in the source Active Directory to be migrated to the target environment.
- One service account with administrative rights on the target domain(s)
 - If administrative rights cannot be granted, the service account requires the following rights:
 - The ability to create and modify user objects in the desired OUs in the target Active Directory environment.
 - Read Permissions to the configuration container in Active Directory
 - User credentials with the delegated migrateSIDHistory extended right.
- A service account in each source and target domain with the ability to modify computer objects and add computers to the domain.

4.7 SQL Server Reporting Services (SSRS) Account Requirements

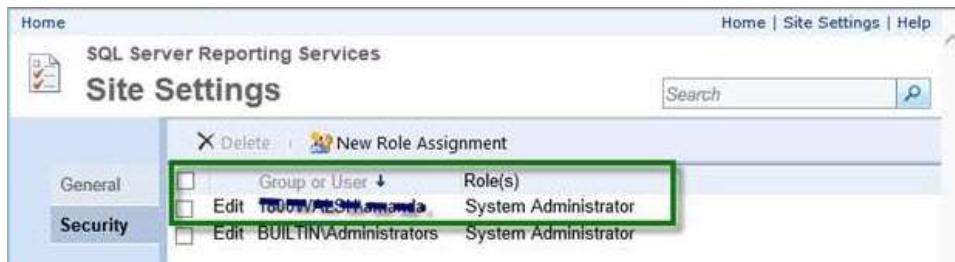
Active Directory Pro's Reporting feature requires credentials in the following places:

- Content credential: Credential for accessing the report server content.

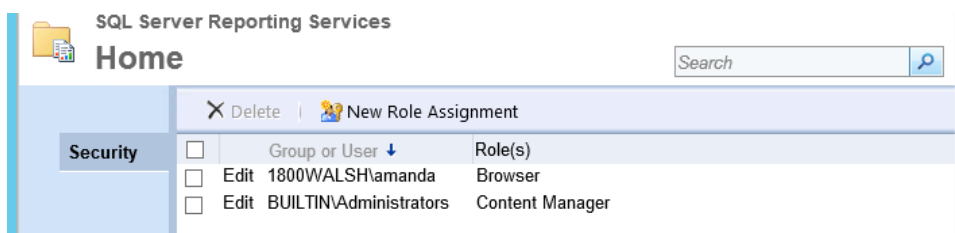
You must set the securities in two different places in the SSRS 'Report Manager' web interface (<http://<servername>/Reports>) to connect to the report server and upload reports from the installation program.



In the Site Settings, you MUST enable the 'System Administrator' role during installation. After installation is complete, you may change this user's role to 'System User' if desired.

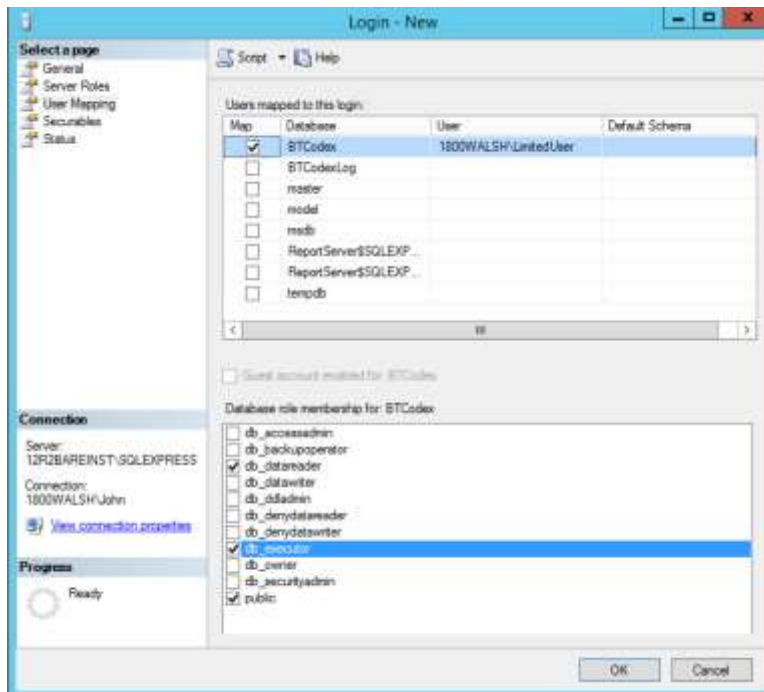


In the Folder Settings, you must add the same user with (at least) 'Browser' permission.

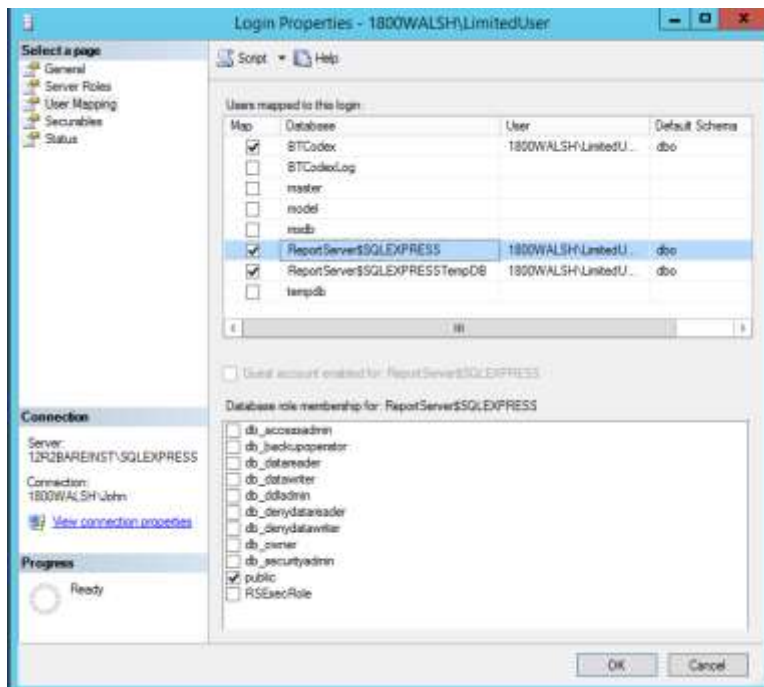


- Data Source Credential: The Data Source is used to access queries in the ADM database. These credentials and roles are set in the SQL server with SSMS

The user must have public, db_reader, and db_executor roles on the ADM database.



The user must have the public role on the report server and report server temp databases.



4.8 DNS SRV Record Requirement

In each source domain, a SRV DNS record must be created to enable autodiscover for Active Directory Pro agents.

- To enable autodiscover when HTTPS is desired
 - Record Name: `_btadm._https.SourceDomainName.Local`
 - Weight and Priority: 0
 - Port Number: 443
- To enable autodiscover when HTTP is desired
 - Record Name: `_btadm._http.SourceDomainName.Local`
 - Weight and Priority: 0
 - Port Number: 80

4.9 Directory Sync Pro Requirement for Synchronizing Passwords

If you are planning to use the Password Copy functionality of Active Directory Pro, PsExec must be installed in the Directory Sync Pro program directory (C:\Program Files\Binary Tree\DirSync). Ignore the PSEXec Installation Guide concerning the proper installation location. PsExec is available at: <https://technet.microsoft.com/en-us/sysinternals/bb897553>

4.10 Offline Domain Join (ODJ) Requirements

In order to successfully facilitate the new Cached Credentials job (which supports the Offline Domain Join feature) a one-way external trust must be configured from the source domain to the target domain.

The devices that the ODJ process is being run on must have network connectivity to BOTH the source and target environments at the same time in order to have the Cached Credentials function work properly.

Be aware that Microsoft's Djoin.exe utility only supports the Windows 7, Windows 8, Windows 8.1, Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, and Windows Server 2016 operating systems. Offline domain join files must be created prior to running the Offline Domain Join process. A full explanation of Microsoft's Djoin.exe utility and how to create these files can be found here:

<https://technet.microsoft.com/en-us/library/offline-domain-join-djoin-step-by-step%28v=ws.10%29.aspx>

Section 5. Requirements for Both Directory Sync Pro and Active Directory Pro

5.1 Browser Requirements

Directory Sync Pro uses a browser-based user interface. We recommend using Chrome v48.0 (or newer) or Firefox v44.0 (or newer) for the best browser experience.

The browser Download settings should be configured to ask you where to save files before downloading.

5.2 SID History and Password Synchronization Requirements

SID History Synchronization Requirements

Microsoft requires an administrative account in the source domain.

In order to support synchronization of SID History from the source to the target domains, Windows requires that a specific domain local group exists and that account auditing is enabled.

The source and target domains must not have the same NETBIOS name to allow the required trust between the two environments.

Communication between a Source PDC and the configured Target GC is required for SID History Migration to successfully complete. Please note, there are additional ports that must be open between the Source PDC and the configured Target GC as defined in Section 3. Directory Sync Pro Advanced Network Requirement's (Directory Sync Pro Profile with SID History Synchronization selected) of this document.

Preparing the Source and Target Domains

To prepare each source and target domain for SID History Synchronization, the following configuration steps must be completed:

- In the source domain, create a local group called SourceDomain\$\$\$, where SourceDomain is the NetBIOS name of your source domain. For example, if your domain's NetBIOS name is ADM, you must create a domain local group named ADM\$\$\$.



SID History synchronization will fail if members are added to this local group.

- Enable TCP/IP client support on the source domain PDC emulator:
 1. On the domain controller in the source domain that holds the PDC emulator operations master (also known as flexible single master operations or FSMO) role, click **Start**, and then click **Run**.
 2. In **Open**, type **regedit**, and then click **OK**.
 3. In Registry Editor, navigate to the following registry subkey:


```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\LSA
```
 4. Modify the registry entry **TcpipClientSupport**, of data type **REG_DWORD**, by setting the value to 1.
 5. Close Registry Editor, and then restart the computer.

- Enable auditing in the target domain:
 1. Log on as an administrator to any domain controller in the target domain.
 2. Click **Start**, point to All Programs, point to Administrative Tools, and then click **Group Policy Management**.
 3. Navigate to the following node: Forest | Domains | Domain Name | Domain Controllers | Default Domain Controllers Policy
 4. Right-click **Default Domain Controllers Policy** and click **Edit**.
 5. In Group Policy Management Editor, in the console tree, navigate to the following node: Computer Configuration | Policies | Windows Settings | Security Settings | Local Policies | Audit Policy
 6. In the details pane, right-click **Audit account management**, and then click **Properties**.
 7. Click **Define these policy settings**, and then click **Success and Failure**.
 8. Click **Apply**, and then click **OK**.
 9. In the details pane, right-click **Audit directory service access** and then click **Properties**.
 10. Click **Define these policy settings** and then click **Success**.
 11. Click **Apply**, and then click **OK**.
 12. If the changes need to be immediately reflected on the domain controller, open an elevated command prompt and type `gpupdate /force`.
 13. Repeat the above steps in the source domain.



It may also be necessary to reboot the domain controller to have auditing take effect.

Even with group policy applied on the default domain controller for the domain audit, the server audit setting on the primary domain controller (PDC) may not be enabled. Please confirm this setting is enabled for the local security policy on the PDC server. If not enabled, use the local security policy to enable this setting.

Validate Cross-Domain Verification

In order to receive the maximum benefit a trust should be in place. When a trust is present, it is necessary to ensure that the trust is properly configured to permit cross-domain verification. To do so, first identify if the trust between the source and target domain is an external trust or a forest trust. Next, following commands must be run from an administrative command prompt:

If the trust between the source and target is an external trust:

- From the source domain:
 - `Netdom trust SourceDomain /domain: TargetDomain /quarantine:No /user: domainadministratorAcct /password: domainadminpwd`
- From the target domain:
 - `Netdom trust TargetDomain /domain: SourceDomain /quarantine:No /user: domainadministratorAcct /password: domainadminpwd`

If the trust between the source and target is a forest trust:

- From the source domain:
 - `Netdom trust SourceDomain /domain: TargetDomain /enablesIDHistory:Yes /user: domainadministratorAcct /password: domainadminpwd`
- From the target domain:
 - `Netdom trust TargetDomain /domain: SourceDomain /enablesIDHistory:Yes /user: domainadministratorAcct /password: domainadminpwd`

Domain Controller Access

If SID History will be synchronized, any Domain Controller listed in the Target DCs tab within a Directory Sync Pro profile will require access to the Domain Controller holding the PDC Emulator Active Directory FSMO role in the source. Keep in mind that even if the Domain Controller holding the PDC Emulator Active Directory FSMO role is not listed in the Source DCs tab, any SID History migration attempts will require a DC in the target to communicate with the PDC Emulator domain controller. For this reason, it is a best practice to ensure that all Domain Controllers specified in the Target DCs tab within a Directory Sync Pro profile has the appropriate networks access to communicate with the source Domain Controller holding the PDC Emulator Active Directory FSMO role before a SID History migration is attempted.

Password Synchronization Requirements


The domain controller with the PDC Emulator FSMO role must not be configured to run LSASS as a protected service or the password sync will fail with an access denied error.

5.3 Password Requirements

Directory Sync Pro and Active Directory Sync Pro do not validate the password policies present within your domains. Verify that the password entered as the Default Password complies with the password policy of your target environment. Objects will fail to be created if the password violates that policy.

5.4 Internet Requirement for Online Help and Video Tutorials

An internet connection is required to access the online help system and video tutorials.

- Within the Directory Sync Pro and Active Directory interface, the online help system can be accessed by clicking "HELP" in the pull-down menu ☰ and the video tutorials can be accessed by clicking the  icons found throughout the application. Relevant topics in the online help system can be found using the Search bar at top of the page or navigated to while viewing topics by clicking on a topic in the list on the left side of the page. Individual topics can be printed by using the browser's Print function.
- The online help system and video tutorials can be accessed outside the Directory Sync Pro and Active Directory Pro interface at <https://help.binarytree.com/dirsyncpro/18.9/default.htm> or <https://help.binarytree.com/adpro/18.9/default.htm>
- Windows Server operating systems will need to have the Desktop Experience feature (or a video codec) installed to view the video tutorials.

Section 6. Installing Directory Sync Pro and Active Directory Pro

The Binary Tree Directory Sync Pro and Active Directory Pro installer can be used to install both Directory Sync Pro and Active Directory Pro at the same time or individually. Active Directory Pro should only be installed at the same time as Directory Sync Pro or if it has previously been installed on the same server.

This guide includes the steps for installing Directory Sync Pro and Active Directory Pro at the same time. Installing Directory Sync Pro first and running the installer again to install the Active Directory Pro components is another option.

The installer creates a local group on the Directory Sync Pro server named BDirSyncPro and will add the currently logged in user to the group. Other users or a Domain group can be added to provide access to other users.



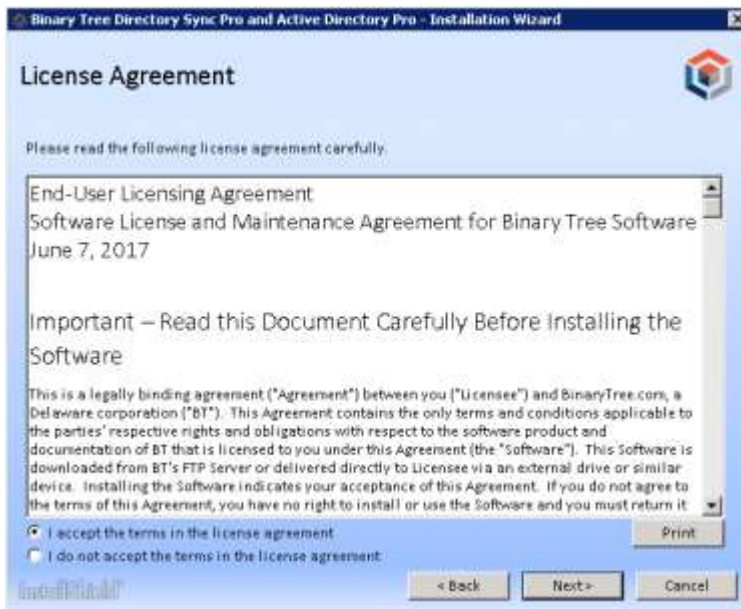
It is recommended to select “SQL Server Authentication” during the Directory Sync Pro/Active Directory Pro server console installation if multiple people will be accessing the Directory Sync Pro/Active Directory Pro web user interfaces. Otherwise, if “Windows Authentication” is chosen during installation, create a security group in AD and assign DB Owner rights to the Directory Sync Pro SQL databases and add all the users that need access to the console as members.

6.1 Installing Directory Sync Pro and Active Directory Pro on a Windows Server

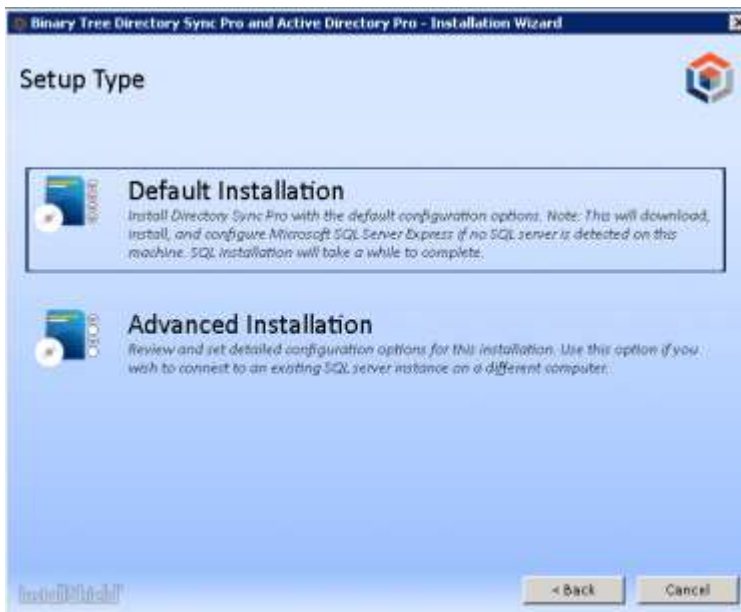
1. Download the installer executable file from the FTP site and save it on the Binary Tree Windows Server.
2. Double-click the executable to begin installing Active Directory Pro. The Welcome screen appears. Click **Next** to continue.



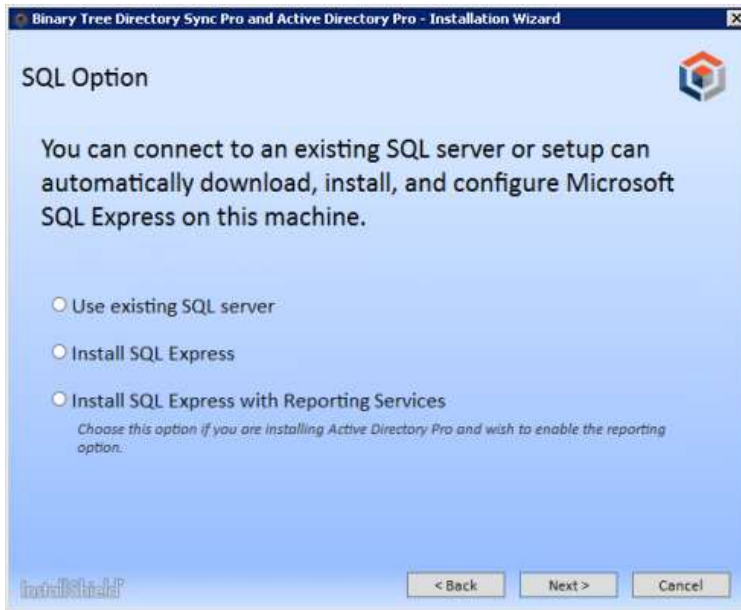
3. The License Agreement screen appears. To accept the terms of the license agreement and continue with the install, select “I accept the terms in the license agreement” and click **Next**.



4. The Setup Type screen appears.
 - Select **Default Installation** to install Directory Sync Pro and/or Active Directory Pro with the default configuration options. A series of screens will appear while installing the needed databases and features. The Install Wizard Completed screen will appear when done.
 - Select the **Advanced Installation** option to review and set the configuration options for the installation. The Install Wizard will continue to the next step.



- The SQL Option screen appears. Select to use an existing SQL server or to install SQL Express and then click **Next**. If you choose to install SQL Express, a series of installation screens will appear while SQL Express is being installed.



- The Installation screen appears and will remain open. The Recommended Components screen will appear in a separate window. You will be prompted if there are applications using files that need to be updated by the installer.



7. The Recommended Components for This Computer screen appears. By default, only the Directory Sync Pro components are selected. To install Active Directory Pro, select the **Directory Sync Pro/Active Directory Pro**, **Active Directory Pro**, and (optionally) **Active Directory Pro Reports** components and click **Next** to continue.



8. The Installation Directory screen appears. Both Directory Sync Pro and Active Directory Pro are installed in the same directory. Click **Browse** to choose a different install location. Click **Next** to continue.



- The Device Log Virtual Directory screen appears. Click **Browse** to choose a different location where device logs will be written. Click **Next** to continue.



- The File Location for Download Jobs screen appears. Click **Browse** to choose a different location where download jobs will be saved. Click **Next** to continue.



11. The Database Server Login screen appears. Enter the SQL Database Server Location, credential information, and database name. Click **Next** to continue. If you chose to install SQL Server Express, the installer sets the “sa” account with the default password “Password1”.

The screenshot shows the 'Database Server Login' dialog box for 'Binary Tree Directory Sync Pro and Active Directory Pro'. The 'Connection Name' is 'DirSync_Database'. The 'Database server that you are installing to' is 'local\SQLEXPRESS'. Under 'Connect using', 'SQL Server authentication using Login ID and Password below' is selected. The 'Login ID' is 'sa' and the 'Password' is 'Password1'. The 'Name of database' is 'DirSyncPro'. The 'Next' button is highlighted.

12. The Database Server Login screen appears again, this time for the logging database. Enter the SQL Database Server Location for the logging database, credential information, and database name. Click **Next** to continue.

The screenshot shows the 'Database Server Login' dialog box for the logging database. The 'Connection Name' is 'Logging_Database'. The 'Database server that you are installing to' is 'local\SQLEXPRESS'. Under 'Connect using', 'SQL Server authentication using Login ID and Password below' is selected. The 'Login ID' is 'sa' and the 'Password' is 'Password1'. The 'Name of database' is 'DirSyncProLog'. The 'Next' button is highlighted.

13. If you selected to connect using Windows Authentication on the previous screen, a screen to enter domain username and password appears. Enter the domain user in DOMAIN\username format and the password. Click **Next** to continue.

14. If you selected to install the optional Reporting feature, the SQL Report Server screen appears. Enter the Report Server URL and select the appropriate Connection Credential and Data Credential options. Clicking the **Test** button to verify the SSRS connection credential is a best practice. See the Appendix of this document for information on verifying the Report Server URL. Click **Next** to continue. If SQL Server Reporting Services (SSRS) is not set up, click **Skip** and **OK** on the confirmation window.



The Connection Credential requires an account that has the Content Manager role and the System Administrator role defined on the SQL Server Reporting Server.

The Data Credential requires an account that has permission on the SQL Server Reporting Services database. These permissions are typically the database-level roles db_datareader and db_datawriter but should be verified by the SQL Server Reporting Services database administrator.

Reports will not appear in the Active Directory Pro Console UI if the installation of the Reporting feature is skipped.

To install the Reporting feature at a later time, select to Modify the installation from the Programs and Features page in the Control Panel.

When an AD credential is used as the Data Credential on the SQL Report Server screen in the Active Directory Pro installer, the Windows Credential check box is not checked. This will need to be changed manually in the DataSource in the Report Server after installation is completed.

15. The Ready to Install screen appears. Click **Install** to begin the installation.



16. When the installation completes, the InstallShield Wizard Complete message appears. Click **Finish**.



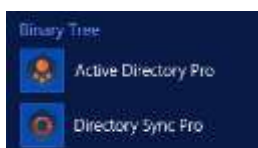
Also, click **Finish** on the Installation window.



If upgrading from a previous version of Directory Sync Pro, you must delete the C:\Windows\BTPass folder from all domain controllers being used in the Directory Sync Pro profiles. A new version of BTPass will be pushed to the domain controllers on the next sync.

- The Apps screen or Start Menu is updated and the Active Directory Pro and Directory Sync Pro icons are added to the desktop.

Apps screen:



Desktop icons:



If planning to use the Password Copy functionality of Active Directory Pro Synchronization, PsExec must be installed in the Directory Sync Pro program directory (C:\Program Files\Binary Tree\DirSync). Ignore the PSTools Installation Guide concerning the proper installation location. PsExec is available at: <https://technet.microsoft.com/en-us/sysinternals/bb897553>

Section 7. Upgrading Directory Sync Pro and Active Directory Sync Pro

Directory Sync Pro and Active Directory Pro can be upgraded to a new version without uninstalling the existing version. The install wizard will detect the necessary changes and manage the upgrade.

7.1 Supported Upgrade Path

Upgrades are supported to the latest GA (Generally Available Release) from two GA versions prior. GA releases are listed on our website. If you are upgrading to a CSR (Customer Specific Release), please contact Binary Tree Support for clarification on whether the upgrade is supported.

If upgrading from a release older than two releases prior to the current GA, it is highly recommended that Binary Tree Support is contacted to discuss upgrade options for your specific environment. Some implementations which are more complex or have custom configurations may require a dedicated resource to assist in the upgrade process. If the upgrade goes beyond the scope of product support, this issue will be escalated to our Professional Services to assist at a billable rate.

Please contact Binary Tree Support (support@binarytree.com) if you have questions or need clarification on the Directory Synchronization upgrade process.

7.2 Upgrade Process

Directory Sync Pro and Active Directory Pro can be upgraded to a new version without uninstalling the existing version. The installation wizard will detect the necessary changes and manage the upgrade.

Redeploying the Active Directory Pro agents after upgrading is recommended in order to take advantage of new features in the new version of Active Directory Pro. Both the current version and previous version (n-1) of the agent are supported.



Any customizations to the System actions in the ADM_Command and/or ADM_ActionCommand tables will be overwritten upon upgrade. If new custom actions are added through the user interface, those will not be lost during future upgrade.

The PowerShell commands that are installed and stored in the SQL database should not be modified as they may be lost during an upgrade.

Careful consideration should be taken when:

- Upgrading in a production environment
- Upgrading an older release of Directory Sync Pro to the latest release

Recommendations:

- Truncating the log or reducing the log size as much as possible before upgrading is recommended. This will reduce the amount of time needed to rebuild the log table index during the upgrade process.
- The examination of the Log SQL database during an upgrade may take longer than expected. Please allow the process to complete and the upgrade installation to proceed.

1. Download the install executable file of the new version from the FTP site and save it on the server.

2. Run the executable file. The install wizard will appear and proceed through the standard installation steps.

NOTE!

You must delete the C:\Windows\BTPass folder from all domain controllers being used in the Directory Sync Pro profiles. A new version of BTPass will be pushed to the domain controllers on the next sync.

NOTE!

Mirroring should be stopped in the SQL environment prior to upgrading or installing.

Section 8. Modifying, Repairing and Uninstalling Directory Sync Pro and Active Directory Pro

Directory Sync Pro and Active Directory Pro can be modified, repaired, or uninstalled from the Programs and Features upgraded to a new version without uninstalling the existing version. The install wizard will detect the necessary changes and manage the upgrade.

1. Open Programs and Features by clicking the **Windows Start** button, clicking **Control Panel**, and clicking **Programs and Features**.
2. Select **Directory Sync Pro** or **Active Directory Sync Pro** from the list of programs and click **Change**.
3. The wizard screen appears displaying the following options. Select one of the following options and click **Next**:
 - **Modify** – use the Modify option to add and subtract components of Directory Sync Pro and/or Active Directory Pro. This is useful if you wish to add or remove the Directory Sync Pro Console.
 - **Repair** – use the Repair option if Directory Sync Pro and/or Active Directory Pro needs to be repaired due to corruption.
 - **Remove** – use the Remove option to uninstall Directory Sync Pro and/or Active Directory Pro. You can also uninstall by clicking Uninstall on the Programs and Features page.



4. Proceed through the wizard until finished.

Section 9. Active Directory Pro Agent Installation

9.1 Installing the Active Directory Pro Agent on Devices

The Active Directory Pro Agent is a key component of Active Directory migration. The agent contacts the Active Directory Pro server at regular intervals, called polling, looking for jobs and tasks to perform.

Refer to the Requirements to verify all workstations and servers meet the requirements for agent installation.

Agent Installation

The agent can be installed using a GPO (Group Policy Object) or manually.

To install the agent with a GPO:

1. Right-click on the Active Directory Pro Agent Installer MSI, point to **Share with**, and click on **specific people**.
2. Add a security group. The "authenticated users" group already includes all computers and is a good group to use. The group you add must have the shared Read permission and NTFS permission.
3. Click **Share**.
4. Click **Done**.
5. From the **Start** menu, point to **Administrative Tools** and click on **Group Policy Management**.
6. Right-click on the domain or OU you will be migrating and click on **Create a GPO in this domain, and link it here**.
7. In the New GPO dialog box, enter a **Name** for the GPO and click **OK**.
8. Click on the new GPO and click **OK**.
9. Right-click on the GPO and select **Edit**.
10. Open **Computer Configuration > Policies > Software Settings** and right-click on **Software Installation** and then point to **New** and click on **Package**.
11. In the **File Name** field, enter the UNC path to the MSI file and click **Open**.
12. Select the **Active Directory Pro Agent** and click **Open**.
13. In the Deploy Software window, select the **Assigned** deployment method and click **OK**.



The device must be rebooted for the applied group policy to complete the agent installation.

To verify the GPO:

1. Log on to a workstation within the scope of the GPO using administrator credentials.
2. From a command prompt on the workstation, run **gpresult -r**

- The Computer Settings section will display the applied group policy.



A newly applied group policy will not immediately be displayed.

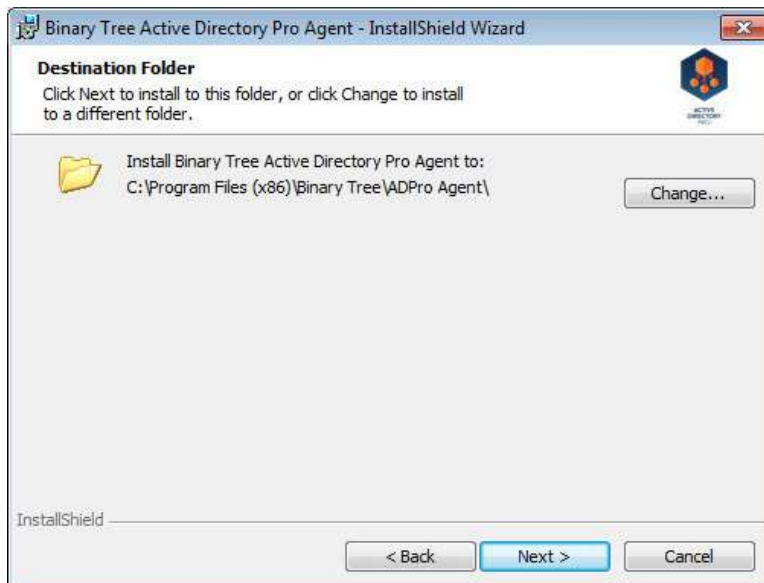
The Computer Settings section displays the applied group policy, but the agent installation is not completed until the device is rebooted.

To manually install the agent:

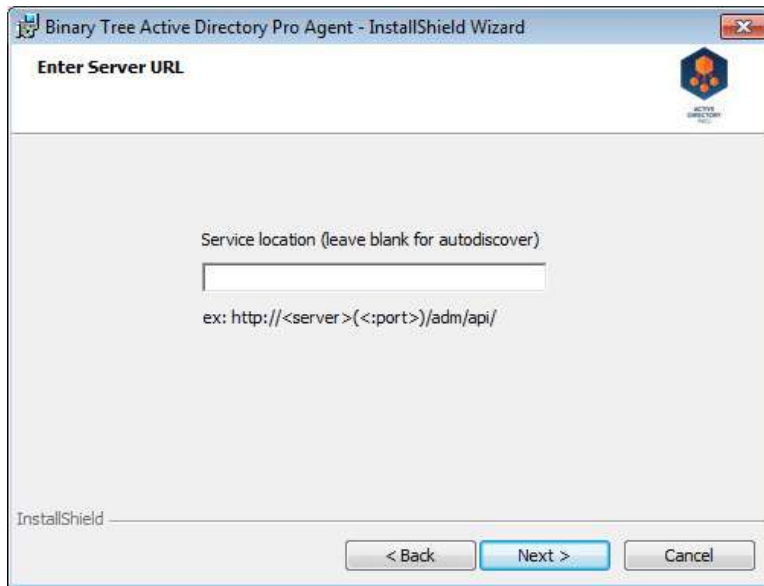
- Copy the Active Directory Pro Agent Installer MSI file to each computer.
- Double-click the file to open the installer.
- On the Welcome screen, click **Next**.



- On the **Destination Folder** screen, click **Next**.



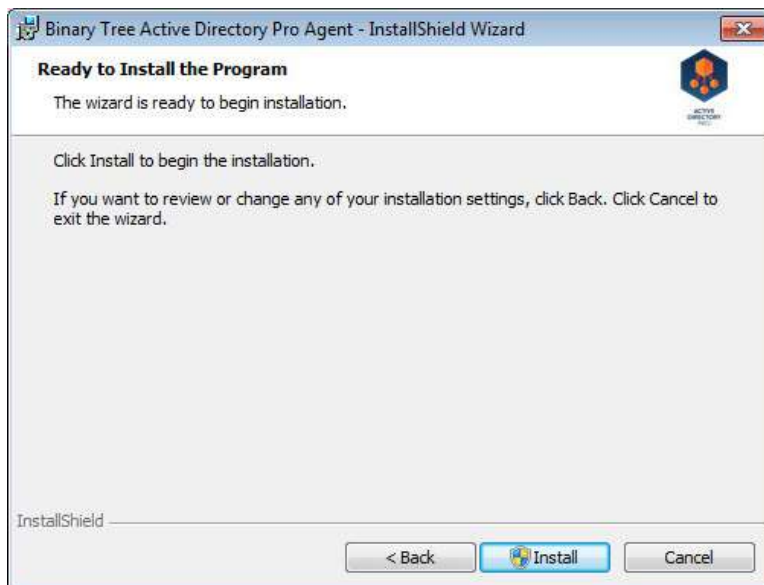
5. On the **Enter Server URL** screen, enter the FQDN of the server running the Active Directory Pro service and click **Next**.



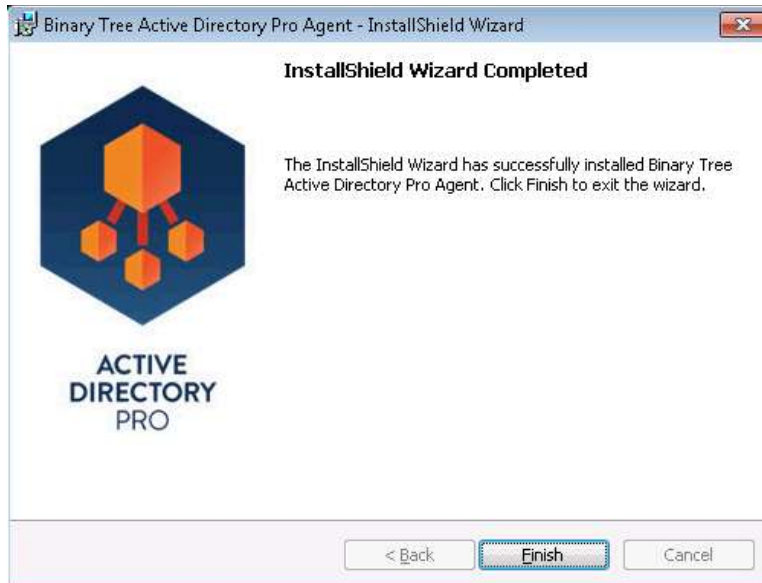
Leave this screen blank if an SRV record has been created. See [Creating SRV Records](#) below for more information.

If there is an SRV record found in the Domain, any entry manually entered during the agent install for the Server URI will be ignored.

6. On the **Ready to Install the Program** screen, click **Install**.



- When the install completes, click **Finish**.



Refer to the Troubleshooting section to resolve common agent install issues.

Creating SRV Records

The Active Directory Pro Agent uses DNS to "autodiscover" the Active Directory Pro server. An SRV (service location) record must be created in DNS to point the clients to the correct server or servers.

To create an SRV record using DNS Manager:

- In the DNS Manager, right-click on the DNS server and click on **Other New Records**.
- In the Resource Record Type dialog, select the **Service Location (SRV)** type and click **Create Record**.
- In the New Resource Record dialog, enter "_btadm" in the Service field.
- Enter the following information for HTTP or HTTPS:
 - For HTTP:
 - Protocol: _http
 - Priority: 0
 - Weight: 0
 - Port Number: 80
 - Host offering the service: the FQDN of server running the Active Directory Pro service.

- For HTTPS:

Protocol: `_https`

Priority: 0

Weight: 0

Port Number: 443

Host offering the service: the FQDN of server running the Active Directory Pro service.



You can make SRV records using HTTP, HTTPS, or both protocols. Using HTTPS is suggested for increased security. If both protocols are used, the agent will always attempt to use HTTPS first.

5. Click **OK**.

Every client running the agent software must be able to resolve the DNS records.

To verify the clients can resolve the SRV DNS records:

1. Open a command prompt on the client machine.
2. Run `nslookup -q=srv _btadm._http.source.int` where "http" is the protocol: http or https, and "source.int" is the name of the source domain.

Section 10. Troubleshooting

10.1 Active Directory Pro Agent Installation Troubleshooting

- **Problem:** The device registers, but does not get discovered (Discovery Status remains blank in the Active Directory Pro console).
Solution: Install PowerShell 2.0 or higher on the client. Operating systems earlier than Windows 7 do not natively include PowerShell.
- **Problem:** During manual installation, a "wizard interrupted" error appears.
Solution: Install .NET 4.5.2 or higher on the client and run the installer again.
- **Problem:** After a successful manual install, an "Unable to register" error appears in the Event Viewer.
Solution: Verify the path to the Active Directory Pro server is correct and complete.
- **Problem:** After a successful manual install, an "Unable to auto-discover" error appears in the Event Viewer.
Solution: The SRV records are missing, incorrect, or unreachable. Verify SRV records are set up properly.

Appendix A: Configuring Directory Sync Pro in a Non-English Active Directory Environment

Directory Sync Pro refers to several system groups by their English names, which will not function properly when deploying in environments where non-English Active Directory is deployed. To resolve this, the mapping of these systems group names can be configured to accommodate non-English language deployments.

There are five new .config file values, representing the five system groups used by Directory Sync Pro: All Users, All Groups, All Rooms, Default Global Address List, and Deleted Objects. To localize a value, edit **BinaryTree.Dirsync.Exchange.exe.config** on the Exchange Coexistence server and add the colored text below (the existing configuration is shown below in black), replacing the value with the equivalent value in the appropriate language.

```
<?xml version="1.0"?>
<configuration>
<configSections>
  </configSections>
<appSettings>
  <add key="ExchangeOrgCN"
    value="CN=MyLocalName,CN=Microsoft Exchange,CN=Services,CN=Configuration,DC=bte14,DC=local"/>
  <!-- The names of some of the system groups we use are localized.
    To use the localized versions, replace the string in value with the localized name, e.g.
    <add key="LocalizedAllUsers" value="Tous les utilisateurs"/>
  -->
  <add key="LocalizedAllUsers" value="All Users"/>
  <!--Tous les utilisateurs-->
  <add key="LocalizedAllGroups" value="All Groups"/>
  <add key="LocalizedAllRooms" value="All Rooms"/>
  <add key="LocalizedDefaultGlobalAddressList" value="Default Global Address List"/>
  <!--Liste d'adresses globale par défaut-->
  <add key="LocalizedDeletedObjects" value="Deleted Objects"/>
  <add key="MandatoryUserAttributes"
```

In the following example, "All Users" was replaced with the French equivalent of "Tous les utilisateurs."

Example:

```
<add key="LocalizedAllUsers" value="Tous les utilisateurs"/>
```

Appendix B. Installing and Configuring SQL Server Reporting Services

Installing SQL Server Reporting Services



These instructions are for existing SQL Server installs where reporting services are being added.

Active Directory Pro reporting is supported on SSRS 2012 and 2014. SSRS 2016 is not supported at this time.

1. Load the ISO into the DVD drive.
2. Open **My Computer**.
3. Double-click on the DVD drive to run the **SQL Server Installation Center** dialog.
4. Select **Installation** from the left.
5. Select **New installation or add features to an existing installation**.
6. Click the **OK** button on the Setup Support Rules page if everything passed.
7. Click the **Install** button on the SQL Setup Files page.
8. Click the **Next** button on the Setup Support Rules page if everything passed.
9. Select **Add features to an existing instance of SQL Server** (verify your instance is shown).
10. Click the **Next** button.
11. Check the **Reporting Services** box and click the **Next** button.
12. Click the **Next** button on **Installation Rules**.
13. Click the **Next** button on **Disk Space Requirements**.
14. Click in the **Account Name** field and select **NT AUTHORITY\NETWORK SERVICE**.
15. Click the **Next** button.
16. Click the **Next** button on the **Reporting Services Configuration** to **Install, but do not configure the report server** option.
17. Click the **Next** button.
18. Click the **Next** button on Installation Configuration Rules page if everything passed.
19. Click the **Install** button on the Ready to Install page.
20. If you have a green checkmark on the 'Complete' page, click the **Close** button.
21. Close the SQL Server Installation Center dialog.

Configuring SQL Server Reporting Services

1. Click **Start > All Programs > Microsoft SQL Server > Configuration Tools**.
2. Click on **Reporting Services Configuration Manager**.

3. Click the **Connect** button.
4. Select **Service Account** from the left.
 1. Verify Network Service is set for the built-in account.
5. Select **Database** from the left.
 1. Click the **Change Database** button.
 2. Verify 'Create a new report server database' is selected and click the **Next** button.
 3. Set your security type and click the **Next** button.
 4. Leave the defaults. Verify 'Report Server Mode' is set to 'Native' (Reporting will fail to work if not in Native Mode)
 5. Click the **Next** button.
 6. Click the **Next** button.
 7. Click the **Next** button and it will begin to configure the database.
 8. Click the **Finish** button.
6. Select **Web Service URL** from the left pane.
 1. Click the **Apply** button.
7. Select **Report Manager URL** from the left pane.
 1. Click the **Apply** button.
8. Click the **Exit** button.

Your Report URLs

Browseable URL

http://<servername>/Reports

Or

http://<servername>/Reports_InstanceName (if SQL Server is installed as an instance)

Web Service URL

http://<servername>/ReportServer

Or

http://<servername>/ReportServer_InstanceName (if SQL Server is installed as an instance)

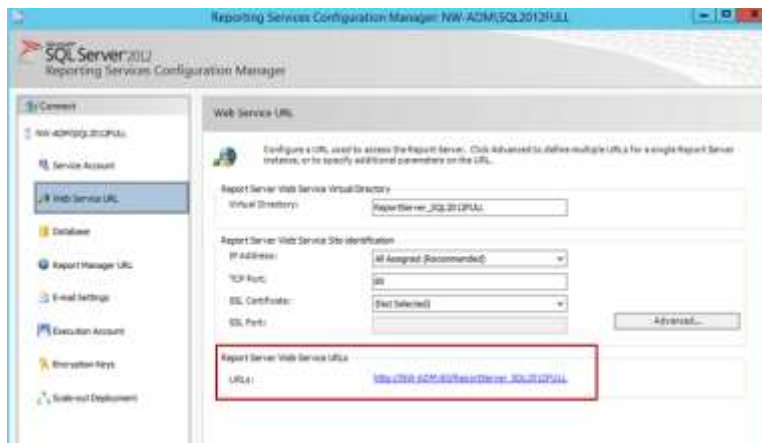
Verifying the Report Server URL

The Report Server URL is needed when installing the Reporting feature. Use the following steps to verify the correct URL to use.

1. Open up Reporting Services Configuration Manager.
2. Provide the SQL Server Name and Report Server Instance name and click **Connect**.



3. In the left folder navigation, select **Web Service URL**.
4. The Report Server URL appears in the Report Server Web Service URLs section.



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