macOS Server to HELIOS

Migration White Paper

September 27, 2018

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1.1 Introduction

Over the years, Apple has gradually been diminishing its role in the network server market. The Apple Xserve hardware line was discontinued by Apple in early 2011. And the Mac OS X Server and subsequent macOS Server software have steadily been losing features. In early 2018, Apple **announced** that many macOS Server services would be deprecated, ". . . to focus more on management of computers, devices, and storage on your network".

Consequently, current and prospective users are considering alternatives.

How can they continue to get the benefits of a server fully compatible with Mac network clients, while gaining additional power, efficiency, and features?

In this document, we show how to migrate and replicate the server services offered by macOS Server, to a server running HELIOS Universal File Server software.

The **HELIOS Universal File Server** software runs on all major server platforms, and adds file and print server services to provide native support for Mac, Windows, web, iOS, and Android network clients. Universal File Server is comprised of these components:

EtherShare »	Apple (AFP) compatible file and print server
PCShare »	Windows (SMB) compatible file and print server
WebShare »	Web portal for file sharing to remote users (Private Cloud)
WebShare Manager »	Drag & Drop synchronization for files and folders
Document Hub »	Secure file sharing and syncing to mobile clients (iOS & Android)
IT Monitor Server »	Monitor your server status via iPhone, receive push notifications
HELIOS Base »	Server Fail Safety, Synchronization Services, Advanced Printing System, etc.
HELIOS Admin	Easy GUI-based remote server administration from Mac, Windows, and UNIX

Table 1.1: Components included in the HELIOS Universal File Server software

Behind the scenes, Universal File Server provides full cross-platform file sharing compatibility, so that users can work from their preferred client(s) without compromise. In addition, it extends many Mac features, such as Spotlight indexing and search, to all users (Mac, Windows, web, iOS, Android), for a consistent user experience.

The **HELIOS Service Controller** provides server fail safety for all HELIOS services, enabling better performance, scalability, and mission-critical reliability. It starts, stops, monitors, and restarts HELIOS services. Separate processes per active user are generated, to enforce file security and ensure process safety.

Universal File Server runs on all major server platforms, so businesses of any size can install it on their server of choice – from a Mac mini for a small workgroup, to enterprise grade servers. For compatibility and ease of migration, when switching from macOS Server, it makes sense to switch to another UNIX-based OS such as Linux, or Solaris, or AIX (rather than a Windows server).

Universal File Server is also available as a turnkey VM: the **HELIOS Virtual Server Appliance**, which can be imported into a hypervisor, and deployed in minutes.

HELIOS solutions are known for their superior performance, scalability, and mission-critical reliability. HELIOS Universal File Server on UNIX offers the most complete, reliable, and easy to administer macOS Server replacement, with the easiest transition for administrators, and a transparent change-over for end-users. This guide should help in the replacement selection and migration processes.

1.2   Server services to migrate

Below is a list of all "Services" which are available in the macOS Server "Server App", with their counterparts on a HELIOS server. Also listed are the OS services which are simply "switched on" via the macOS Server "Server App". We provide a migration description for these services, too.

1.2.1   AFP server

***Provided by* HELIOS EtherShare**
HELIOS EtherShare sets the standard for Mac client support on UNIX servers. EtherShare includes a range of server services that replicate and are fully compatible with Apple technologies, such as AFP, Spotlight indexing and searches, Time Machine backup server, Bonjour server, etc.

EtherShare includes an AFP 3.3 server which is very compatible with the Apple AFP service. The following need to be considered:

❍ *File system case-sensitivity*
   The macOS HFS file system allows administrators to configure case-sensitivity, which will be honored by EtherShare. The macOS Server

HFS is case-insensitive by default, other UNIX systems are mostly case-sensitive. EtherShare has worked case-sensitive on UNIX platforms for over two decades, and we have not seen any problems.

❍ *UNIX permissions and HFS Access Control Lists (ACLs)*
macOS HFS volumes and UNIX volumes support owner, group and mode file system permissions. HFS supports in addition HFS ACLs. These ACLs are not available on most UNIX systems and therefore EtherShare supports the standard UNIX permissions only. However, if the server file system supports additional permissions, e.g. ZFS or UFS ACLs, then these permissions will be honored by all HELIOS products. This means that, if available, ACLs defined on the server will be honored by EtherShare. Modifying ACLs from an AFP client workstation is not supported by EtherShare. More details are available in the EtherShare manual.

❍ *"HELIOS Permissions" tool – Finder extension for file and folder permissions*
Mac clients can use the Finder to view and change permissions of server files.

❍ *Spotlight Search*
HELIOS Base includes the HELIOS Index Server search system which is compatible with the Apple AFP Spotlight protocol. It indexes file names, text, and metadata, for Spotlight compatible searches for file names and content. More details are available in the HELIOS Index Server manual.

Note: Apple supports both AFP and SMB for network file sharing to Mac clients. Which is better? HELIOS testing and end-user feedback shows that AFP is still the preferred protocol. AFP offers the best compatibility and performance for Mac clients, even for macOS 10.13 (High Sierra). Even so, HELIOS is developing SMB protocol support for Mac clients for the future.

1.2.2 SMB/CIFS server

Provided by **HELIOS PCShare**

HELIOS PCShare includes an SMB/CIFS server which is compatible with EtherShare volumes. It also supports Windows file streams and UNIX permissions, including a Windows Shell extension to view/change UNIX permissions. Spotlight searches are also supported on Windows clients using HELIOS PCShare.

Note: At present the HELIOS PCShare SMB/CIFS support is based on the version 1 protocol, newer protocol versions are under development. For Mac environments, SMB/CIFS is not supported and AFP should be used instead. Once PCShare supports newer SMB/CIFS protocols, Macs can also be connected via SMB/CIFS.

1.2.3 Web portal for file sharing to remote users (Private Cloud)

Provided by **HELIOS WebShare**

HELIOS WebShare enables fast and secure remote file access via any web browser. Authorized users can easily access server documents wherever they are, without exposing the server to the Internet. High Security is provided by a two-tier server application. List and gallery views, document previews, and Spotlight search, make it easy to find the desired server files.

1.2.4 File sharing to mobile clients (iOS & Android)

Provided by **HELIOS Document Hub**

The Document Hub app is a component of WebShare, to enable secure access to WebShare sharepoints from mobile devices (iOS and Android). Users can browse files on the server in list or gallery view, see document previews, perform Spotlight searches to find server files, download files for offline use, or

to open and edit files in other apps, upload files to the server, etc. File synchronization ensures that users have current document versions, for reference, presentations, etc.

1.2.5   Remote management GUI application

***Provided by* HELIOS Base**

HELIOS Admin (Fig. 1.1) is a client application which allows easy administration of the HELIOS software. Due to its Java-based design it can be used cross-platform on Windows, macOS, Linux and UNIX clients. Its GUI supports four languages: English, French, German, and Japanese.
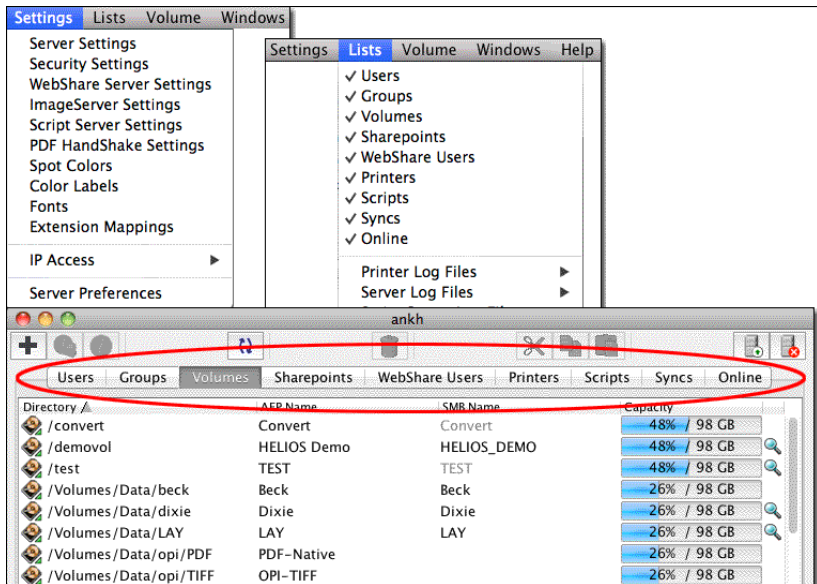

Fig. 1.1: HELIOS Admin

1.2.6   Remote server monitoring with iPhone push notifications

Provided by **HELIOS IT Monitor Server**

Allows IT infrastructure monitoring with e-mail and iPhone push notifications to admins, upon server overload or service failure. Graphical displays show aspects like CPU, network, and memory utilization, to identify bottlenecks or just to confirm that everything is fine. All server system messages, or alarm messages only, can be browsed and searched on the iPhone.

1.2.7   Open Directory

Provided by **HELIOS Base**

The HELIOS services can use local users as well as network users via NIS, AD/PDC, LDAP, and Open Directory (see **HELIOS Authentication Server LDAP** for details about LDAP and Open Directory usage). It offers no server for these services but allows using them from the HELIOS server.

1.2.8   Users & groups

Provided by **HELIOS Base**

With HELIOS Admin the migration of users and groups from one server to another is a cinch:

➢ Install HELIOS Base on the macOS Server.

➢ Use HELIOS Admin to log in on both the macOS Server and the new HELIOS server.

➢ Drag & drop the local users and groups to the new HELIOS machine.

A new password must be assigned to each user. Migrate only real user accounts this way and omit all system accounts e.g. *sys*, *wheel*, *root*, *www*.

Network users (AD/PDC, NIS, OD) can be used from the HELIOS server, without the need to create them anew.

1.2.9   Spotlight server

***Provided by* HELIOS Base**

HELIOS Universal File Server includes a Spotlight compatible Index Server service which can be enabled per volume (see Fig. 1.2). It is fully compatible with the Apple Spotlight properties and query language. Mac clients use it automatically via their mounted AFP volumes. Windows, Web, and mobile clients can also perform Spotlight searches via PCShare, WebShare, and Document Hub. Scripting solutions can use Spotlight searches via the HELIOS "dt" tools. The content indexing includes file names, text files, PDFs, Office documents, IPTC, XMP, and other image metadata information.
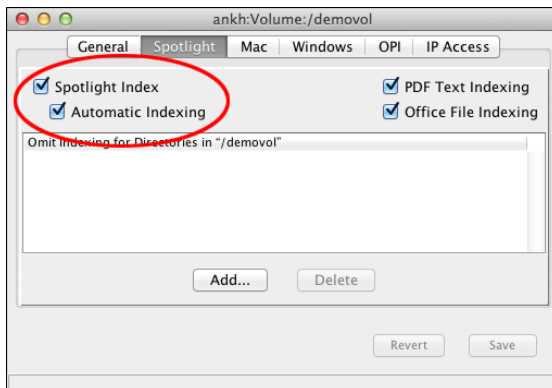

Fig. 1.2: HELIOS Admin Spotlight settings

Note: Search results depend on the different metadata being indexed, some
          formats (Keynote, video, audio, etc.) are not supported by HELIOS Index
          Server. However, other properties such as XMP or PDF form fields are only
          supported by HELIOS Index Server. Additional indexing plug-ins can be
          developed by third parties.

1.2.10   Spotlight search for mobile users (web, iOS, Android)

***Provided by* HELIOS WebShare and Document Hub**

Typing in a few search terms can be easier than browsing a large server volume, especially on small devices. Powerful Spotlight search queries can quickly find needed files, based upon document text and metadata content.

1.2.11   Print server

***Provided by* HELIOS Universal File Server**

HELIOS Base includes a very sophisticated print server which is easy to use and administer via HELIOS Admin (see Fig. 1.3). The queuing system is LPR compatible and allows a variety of output options. More details are available in the HELIOS EtherShare and HELIOS Base manuals.
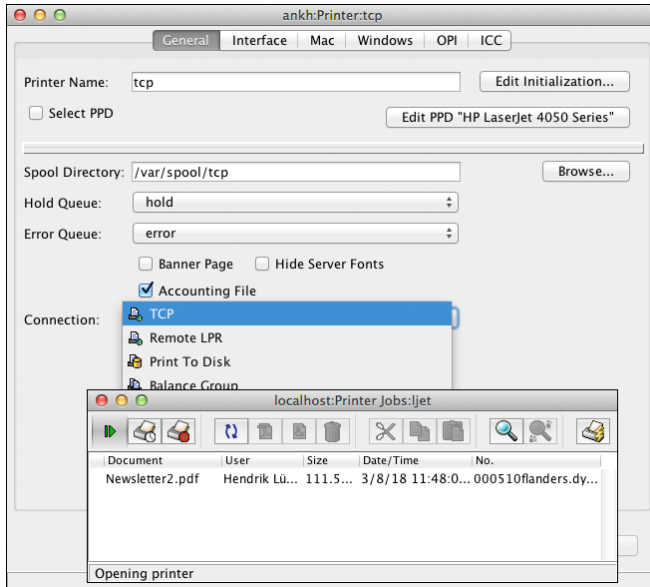
Fig. 1.3: HELIOS Admin printer settings/jobs

1.2.12   Backup support

***Provided by* HELIOS EtherShare**

HELIOS EtherShare includes macOS Time Machine support, so Mac clients can backup to server network volumes. It also adds additional **backup image tools** (see Fig. 1.4) and Time Machine backups observation.

❍ To backup the server itself, Archiware Backup is fully compatible with HELIOS servers, additional third-party backup solutions are available.
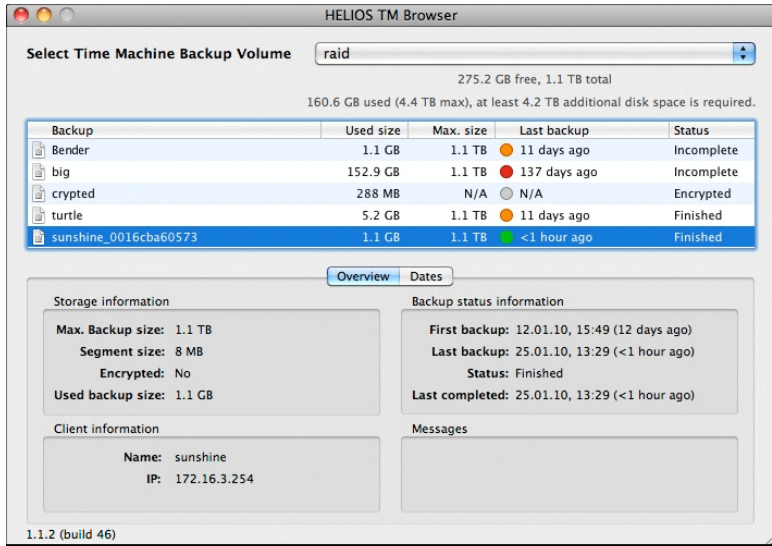
Fig. 1.4: HELIOS TM Browser

❍ HELIOS Synchronization Service allows automatic synchronization of server files, folders, volumes, and even entire disks to make a second copy of the data available. If problems are encountered with the primary data, server, or storage system, the synced data copy can be accessible in moments. The HELIOS Synchronization Service **video** shows how to easily set up and monitor synchronization jobs via the HELIOS Admin GUI.
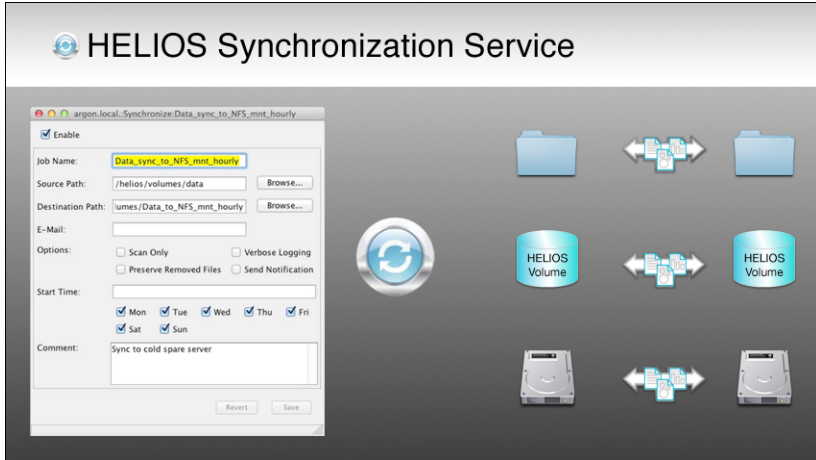
Fig. 1.5: HELIOS Synchronization Service

1.2.13 Bonjour server

Provided by **HELIOS Base**

HELIOS Base is included with every HELIOS product, it includes an advanced Bonjour (mDNS) server as well as a Bonjour proxy server. It enables automatic discovery of servers, printers and other devices and services on networks. More details are available in the HELIOS Base manual.

1.2.14 DHCP server

Provided by **HELIOS Base**

HELIOS Base is included with every HELIOS product, it adds an advanced DHCP server which provides TCP/IP configurations to Windows, Mac, and

other network devices. The secondary DHCP server support allows a second HELIOS server to take over the DHCP service and configuration in case the main DHCP server fails. Find more details in the HELIOS Base manual.

1.2.15 DNS server

Provided by **UNIX built-in services**

A DNS server is included within UNIX. The "named" is the standard DNS server used by most UNIX servers. The configuration must be done manually via its zones files. Please refer to the "named" configuration documentation for details. Additional DNS servers and configuration solutions are available from third parties.

1.2.16 Firewall

Provided by **HELIOS & UNIX built-in services**

All UNIX-based systems offer a software firewall. Please read the OS documentation.

OS	Command
AIX	genfilt
Solaris 10	ipf
Linux	iptables

HELIOS also includes a TCP port firewall on a per-service basis. These security settings can be specified in TCP/IP access lists via HELIOS Admin.

1.2.17   FTP server

***Provided by* UNIX built-in services**

All UNIX-based platforms include an FTP server by default. More power-ful remote file transfer and presentation of data for customers is offered by HELIOS WebShare. For security and ease of use, HELIOS recommends using WebShare instead of FTP.

1.2.18   Remote login

***Provided by* UNIX built-in services**

"rlogin" and "ssh" servers are available for all HELIOS supported UNIX plat-forms. Please refer to the OS vendor documentation and install the additional "ssh" server packages.

1.2.19   File server data migration

This section describes several options to successfully migrate the macOS Server data to the new HELIOS server. A simple UNIX copy will not work because permissions, resource information, creation date and Finder info, such as color labels and Finder view, may get lost.

❍ *Copy files between the servers using a Mac client*
   The disadvantage is that this takes time and all owner and group system permissions are lost.

❍ *HELIOS Xtar backup into a tar archive*
   HELIOS offers a free enhanced "tar" backup tool which includes Mac Finder info and resource information as well as UNIX permissions into a backup "tar" container file. Use the HELIOS included "htar" to restore the backup on the HELIOS server. The commands would be:

```
# cd /Volumes/Data/  # on the OS X Server
# xtar cf /Volumes/Backup/backupdata.tar .
#
# cd /Data/ # on the new server
# umask 0
# /usr/local/helios/bin/htar -xf /backup/backupdata.tar
```

HELIOS developed the "Xtar" tool for macOS **with documentation and download information »**

❍ *Use a third-party backup solution*
For example, Archiware backup is compatible with macOS Server as well as with a HELIOS server. Therefore an Archiware backup can be done on a macOS Server and restored into a HELIOS volume.

Note: None of the backup methods mentioned above will backup/restore ACL permissions.

Composite Unicode UTF-8 encoding is used for file names on HELIOS volumes. Additional Finder info and resource information for each file is stored in a subdirectory ".rsrc/<filename>". Windows file streams are stored in ".rsrc/filename:streamname". Documentation on the HELIOS "Resource/Data File Spec" is available **here**.

Once the data is migrated to a HELIOS volume, the HELIOS "dt" utilities offer UNIX compatible file management, e.g. "dt cp", "dt mv", "dt rm". This preserves metadata and file streams, and updates the Desktop database when doing command line based file management. Details on the "dt" utilities are described in the HELIOS Base manual.

1.3 Services provided by the OS or via third-party solutions

See also Apple's **"Prepare for changes to macOS Server"** document, with potential replacements for deprecated services.

1.3.1 Address Book/iCal

***Provided by* third-party solutions**

This service synchronizes contacts and calendars across the network, based on the CardDAV/CalDAV standard. There are several other implementations available, e.g. the Open Source **Calendar and Contacts server »**.

1.3.2 iChat

***Provided by* third-party solutions**

The iChat server is based on XMPP (also known as *Jabber*), the industry standard IM protocol. This enables support for Mac computers using iChat, as well as for other Jabber clients running on Windows PCs and iPhones.

1.3.3 Mail server

***Provided by* UNIX built-in services**

Every UNIX OS includes mail servers to accept and deliver e-mails (MTA, e.g. *Sendmail* or *Postfix*) as well as server programs to fetch e-mail from the server via POP3 or IMAP (MRA, e.g. *Cyrus IMAP*, *Courier Mail* or *Dovecot*). Configuration of the e-mail server can be a very complex task. Therefore, we recommend use of one of the commercial e-mail servers as an alternate solution.

1.3.4 Mobile Access

***Provided by* Internet access routers**

A service to provide secure access to Address Book, iCal, Mail, and Web services. The Internet access router normally provides a proxy for these services.

1.3.5   NAT (*Network Address Translation*)

Provided by **OS or routers**

The NAT setup is a special case where only one network interface goes directly to the Internet, via a "public" IP address. All intranet nodes have "private" IP addresses. All network communications from the intranet to the Internet are routed to the NAT IP address, and the NAT server then forwards these requests to the Internet. Some UNIX OS's (Linux and OS X) offer NAT services. Most networks have dedicated DSL routers to do this job.

1.3.6   Network time server

Provided by **UNIX built-in services**

A network time server is included in all UNIX-based operating systems. On AIX and Solaris it is called *xntpd*, on Linux *ntpd*. Please read the documentation for the setup.

1.3.7   NFS server

Provided by **UNIX built-in services**

NFS services are included on all UNIX systems, read the documentation for setup details.

1.3.8   Profile Manager

Provided by **third-party solutions**

Profile Manager simplifies deploying, configuring, and managing macOS based computers, and provides Mobile Device Management (MDM) for iOS devices.

1.3.9   RADIUS (*Remote Authentication Dial-In User Service*)

Provided by **third-party solutions**

RADIUS is an Internet Engineering Task Force (*IETF*) standard for centralized Authentication, Authorization, and Accounting (*AAA*) management for computers to connect to and use a network service.

1.3.10   VPN

Provided by **UNIX built-in services/third-party solutions**

VPN is usually done via external router devices. Some UNIX OS's offer a VPN solution, or a third-party solution can be used.

OS	Command
AIX	`ikedb`
Solaris 10	`openconnect (third party)`
Linux	`vpnc, openconnect`

1.3.11   Web server

Provided by **UNIX built-in services**

The Apache web server is included on macOS Server, the same Apache web server is included with the UNIX complementary installation packages. Please read the vendor documentation for details. For Windows a separate download is needed. The main configuration file ("httpd.conf" or "apache2.conf") is compatible between macOS Server and other UNIX platforms running Apache.

Note: Verify that any additional Apache modules in use (e.g. Perl, PHP, Tomcat)
          are already included with the new Apache server. All modules are available
          or can be easily downloaded.

1.3.12   Wiki

Provided by **third-party solutions**

A Wiki-based intranet website where users can work in parallel on different pages. There are many different **Wiki packages available »**

1.4   Unavailable Services

1.4.1   Push notification

An iCal server addition which offers push notifications, for calendar changes.

1.4.2   Software update server

Provided by **third-party solutions**

There is no software update server available from HELIOS. However, there are free solutions available, e.g. Reposado (see **https://github.com/wdas/reposado**).

1.5   HELIOS supported server platforms

HELIOS server solutions are available on all major server platforms, including VMs. **This page** shows all server and client platforms that are currently supported.

1.6   HELIOS maintenance options

HELIOS offers a range of maintenance options to ensure that customers receive help in case of performance and compatibility problems, as well as for product updates and upgrades. The following are available:

❍ *Free Tech Infos*
Provide compatibility advice, available on the HELIOS website.

❍ Software Upgrade Service Agreement
To receive all updates as well as all future upgrades with electronic media and manuals. This is an annually renewing agreement.

❍ *Cold spare option*
The cold spare agreement allows receiving product keys for a second server to allow deployment of the second server in case the main server fails.

❍ *Authentication server support agreement*
This covers advanced NIS, LDAP, AD/PDC planning and support directly provided by HELIOS software engineers to end users.

❍ *Software Subscription Agreements*
Instead of purchasing a product, this includes the product license with updates/upgrades to deploy the HELIOS product for a duration of a year.

The first level support is done by the HELIOS reseller, the second level support is provided by the local HELIOS distributor in the country. HELIOS supports these partners to ensure customers get professional help. Most customers deploying HELIOS products use the "Software Upgrade Service Agreement" because it is the most economical solution which ensures that the installation is always up to date.

1.7   Products to replace macOS Server

The macOS Server is best replaced by the HELIOS Universal File Server software which includes Mac, Windows and remote web and mobile device services as well as an advanced networking and printing system which is easy to install, administer and use.

Additional HELIOS product add-ons offer workflow automation, PDF production, image processing, proofing and document annotation solutions. Detailed information can be found on the HELIOS website.

1.8   Summary

Transitioning from macOS Server can initially appear to be a daunting proposition. But by changing to an OS with a similar UNIX heritage, such as Linux, Solaris, or AIX, and adding the Mac compatible services and server admin provided by HELIOS Universal File Server, replication of most services can be achieved. Any remaining services, if needed, can be maintained on a dedicated Mac system. The new freedom to select server hardware opens up many great options, to optimize systems for each site's specific needs. The additional HELIOS server features such as superior cross-platform compatibility, versatile file synchronization, server fail safety, and the advanced printing system, will yield a more productive server for Mac, Windows, and Web and mobile clients.

So layer a solid UNIX OS on a modern server system, and add the HELIOS Universal File Server, to get a superb macOS Server replacement.

1.9   Other web resources

❍ **HELIOS Quick Start Video Guides »**

❍ **Apple: Prepare for changes to macOS Server »**

❍ **Apple: Xserve Transition Guide »**

❍ **HELIOS Software Manuals (HTML) »**

❍ **HELIOS Backup Image Tools »**