Intel® Entry Storage System SS4200-E

[Helena Island]

March 2008

Agenda

SECTION A:

- Introduction
  - Features
  - Product Offering
  - Usage scenarios
- SS4200-EHW (Hardware only version)
  - Overview
  - Microsoft features
  - Installation
- SS4200-E (Hardware & Software version)
  - Overview
  - Installation Abbreviated

SECTION B:

- System Installation
- System LED Indicators
- Discovery Configuration files
- Troubleshooting With Gather Tool Utility
- System Software Recovery
- Active Directory Implementation & Troubleshooting
- Additional…

Introducing the Intel® Entry Storage System SS4200-E

Is an Intel IA based storage system designed the markets growing storage needs

Positioning:
Flexible NAS appliance for SMB/SOHO and digital home

Target Market:
Small-business, small-office/home-office, and digital home

Value Proposition:
- Large storage capacity: up to 4TB
- Quiet operation
- 3 year Intel Warranty
- Improved performance: Intel Architecture
- Integrates with home and business platforms
- Operating Systems cover on this training (Microsoft Home Server and EMC)
- Increased flexibility:
  - Validated with several SW OS/Apps please check the THOL

Intel® Entry Storage System SS4200-E

Features

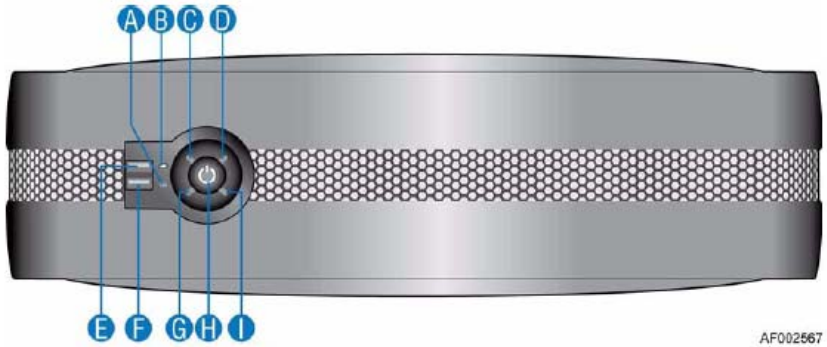
- IA-Based Low End Storage Appliance
- Four SATA ports (3.0Gbps)
- Four Drive Bays
- Conroe–L processor [Celeron 420] 1.6 GHz
- Chipset: 945GZ with ICH7-R
- 512 MB DDR2 SDRAM
- Four USB 2.0 Ports
- 2 x E-SATA Port
- 1 x Gb Ethernet [Intel 82573V]

- Two versions:
  - Hardware Only (SS4200-EHW)
    No DOM Included
  - HW + Software (SS4200-E)
    Integrated software SKU with software by EMC* on DOM
- Launched: January 31, 2008
- Target Markets: SMB, SOHO, Home
- 3 year Intel warranty

Product

Intel® Entry Storage System SS4200-E

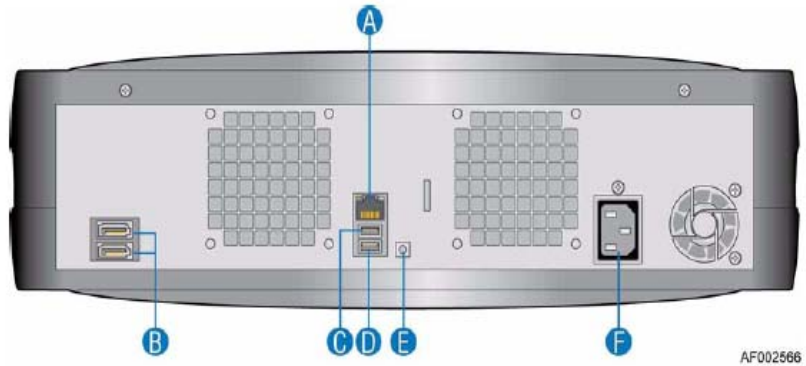
Front View



A. Disk Drive Activity LED	F. USB Port 1
B. NIC Activity LED	G. Disk Drive 1 Status LED
C. Disk Drive 2 Status LED	H. Power/Status Push-button
D. Disk Drive 3 Status LED	I. Disk Drive 4 Status LED
E. USB Port 0	

Figure 3. Front View

Rear View



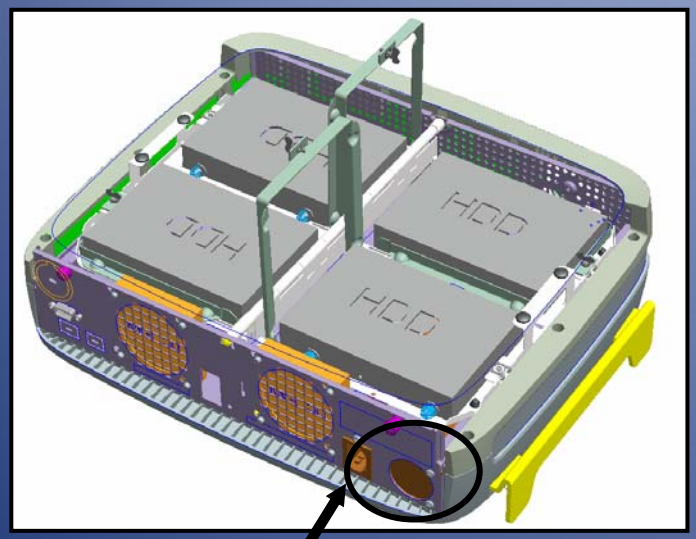
A. NIC Port (1 Gb)	D. USB Port 3
B. e-SATA Port	E. Reset Button
C. USB Port 2	F. A/C Power

Figure 2. Rear View

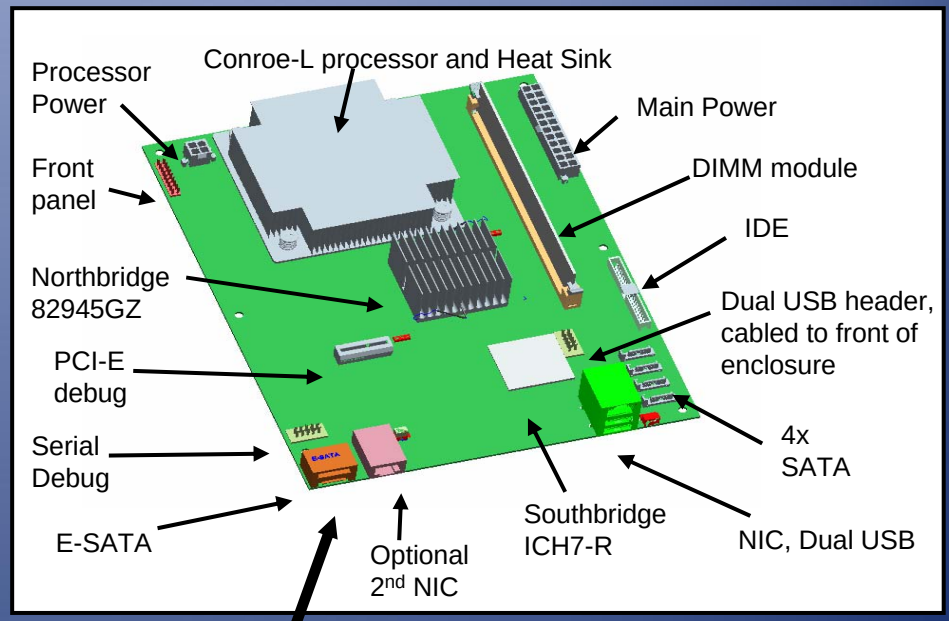
Intel® Entry Storage System SS4200-E

It seems simple but it's not:

- It's design is as demanding as an enterprise product
- Rotational vibration is a serious factor in product reliability and customer satisfaction
- The ease of installing new HDDs is very important
- Acoustics are a key factor in end user satisfaction



To provide vibration dampening from fans, adjacent drives and external sources, each drive is mounted on specially designed, proprietary isolation mounting screws.



Unique designed Main board

Product Offering

1: Hardware Only: SS4200EHW

This hardware-only, application-ready platform was specifically designed for small office and home use with multiple operating systems and software applications. (eg. targetting home market with **Microsoft* Windows Home Server**)

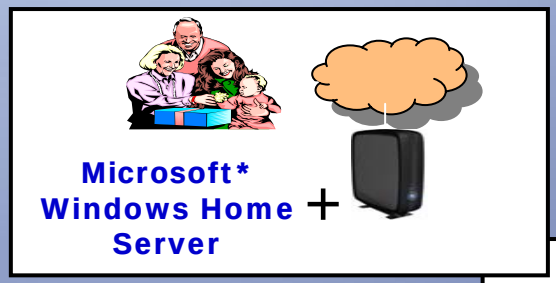
2: Hardware + Software: SS4200E

A complete yet flexible hardware and software NAS solution that instantly adds storage capacity to SMB/SoHo networks. Powered by software from **EMC** it offers intuitive user interface and easy 3-step setup process.

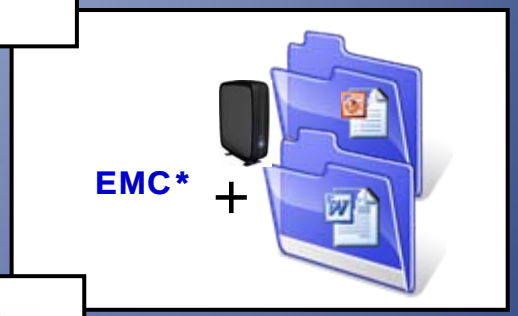
Storage SMB/ SoHo Needs

Usage scenarios

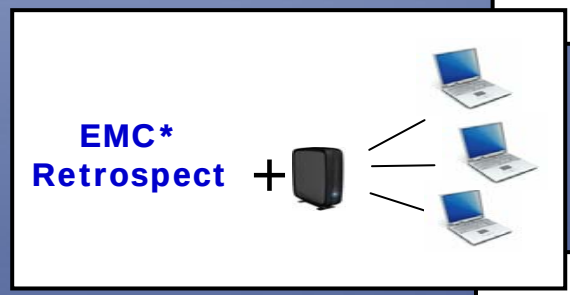
- Home user wants to share media with family members



- SMB needs NAS to store business files



- SMB needs client backup solution



- User wants a media library

- …

Building a New Platform Category

Individual PCs

Data is stored on single PC disk drives

Optical Media & External Drives

Data is stored and shared via optical media and external disk drives

Networked Storage

Data is available to all PCs on the network

Limited backup and expansion

Windows Home Servers

- Sophisticated storage management, automatic backup and complete restore
- Content consolidation and organization
- Media distribution and DRM management
- Seamless storage expansion
- Secure remote access and sharing
- Extensible platform for applications and services

SS4200-EHW

(Hardware only version)

Overview

Hardware only:

- SS4200E storage device hardware
- Operating System to be installed by IPP, IPI or Reseller

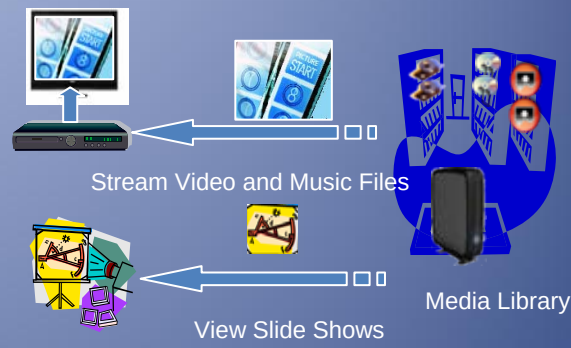
Compliant for **Microsoft* Windows Home Server**

- Low sound/heat level/
- Min cpu specs
- No optical drives, no HW raid
- No external video connection
- No KB/mouse connector
- Internal R232, PCI-E connector
- …

+

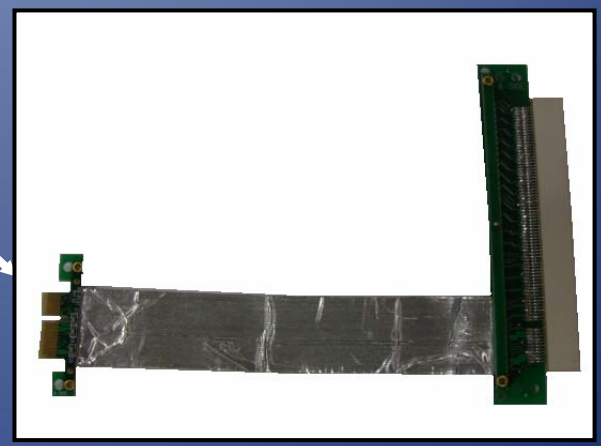
Microsoft* Windows Home Server Features

- **File Sharing**
  - Provides NAS to share files with clients on the network
- **Media Streaming**
  - to devices supporting Windows Media Connect
- **Headless Operation**
  - with Remote Administration
- **Remote Access Gateway**
  - Allows users to access any PCs in the home
- **Health Monitoring**
  - of all PCS on the network
- **Centralized Backup**
  - Allows back of up to 10 PCs
  - Uses Single Instance Store technology
- **Volume Shadow Copy**
  - recovers previous versions of files.



Installation

- Minimum HW requirements:
  - 512MB DDR2
  - min 1x 80GB SATA HDD for Software Installation
- Issue:
  - No video onboard, no optical, no Keyboard/mouse standard ports
- Recommended Installation Procedure:
  - Use the following:
    - USB 2.0 DVD
    - USB KB/ USB Mouse
    - PCI-E x1 to PCI-E x16 converter
    - PCI-E Video adapter
  - Run OS install



Installation Cont...

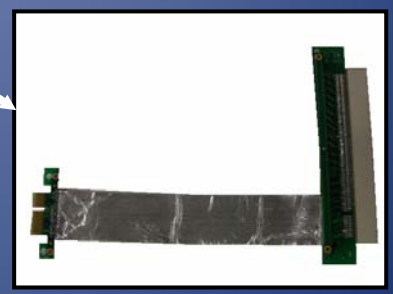
- Bios
  - Update to the latest BIOS currently V090L
  - min 1x 80GB SATA HDD for Software Installation
  - Recomended 4x 250/500/750/1TB HDDs

- BIOS Settings:
  - ATA/IDE Configuration [Enhance]
  - Configure SATA as [AHCI]
  - Configure SATA Channels [Before PATA]

- All other BIOS settings leave them as default

Installation Cont...

- Configuration
  1. Remove the DOM (if one is present).
  2. Install the SATA hard drives that you plan to use for the OS installation.
  3. Copy the contents of “STOR_ALL32_F6FLPY32_7.5.0_1017_PV_SS4200-E.zip” to USB floppy drive.
  4. Remove lid
  5. Connect the PCI-e x1 to x16 converter in PCI-e debug slot
  6. Install PCI-e video adapter into PCI-e extender
  7. Attach video cable to video adapter
  8. Attach USB mouse, keyboard, DVD player and floppy drive



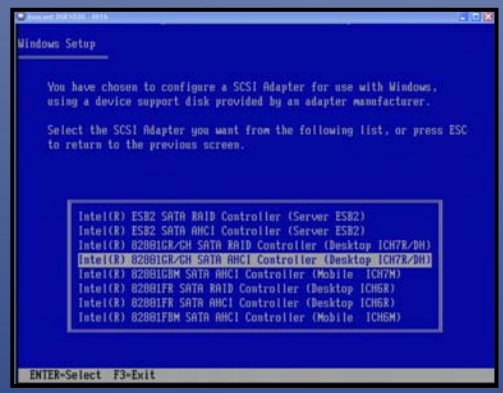
Installation Cont...

- Insert WHS Installation DVD into attached USB 2.0 DVD drive. Insert ahci driver installation floppy to USB floppy drive.
- Reboot the SS4200-E and repeatedly press <F11> during POST (power on self test) until boot device menu appears.

Installation Cont…

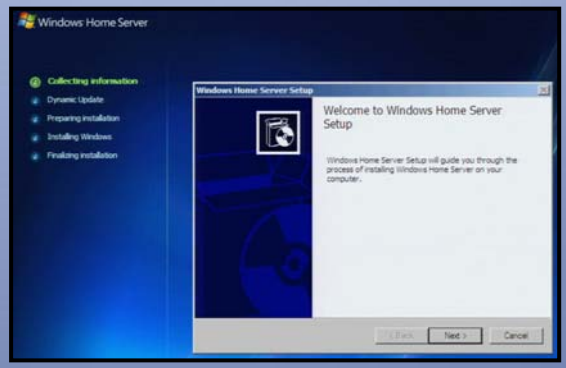
OS installation will go to the second reboot after some of the installation procedure has progressed, preparing installation, copying files, copying installation files, etc. Press<F6> at the ‘Windows Setup’ page when it appears, then press <S> to choose SCSI Adapter.

Choose ‘Intel® 82801GR/GH SATA AHCI Controller (Desktop ICH7R/DH)’

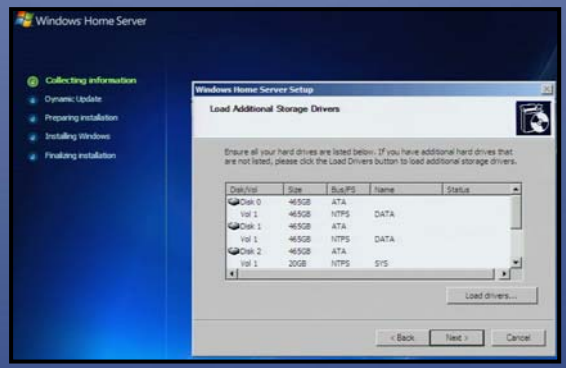


Installation Cont...

- Collecting information
- Dynamic update
- Preparation installation
- Installing Windows
- Finalizing installation



It will take Windows a couple of minutes to inventory the storage devices already connected to your system. These should appear in a list. Some may already have partitions on them from previous usage. The following is an example of the window that should appear.

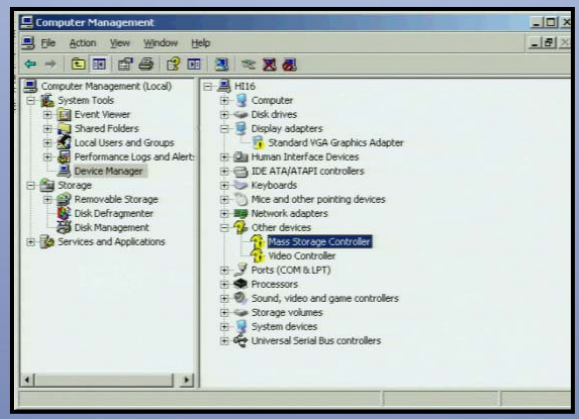


Installation Cont...

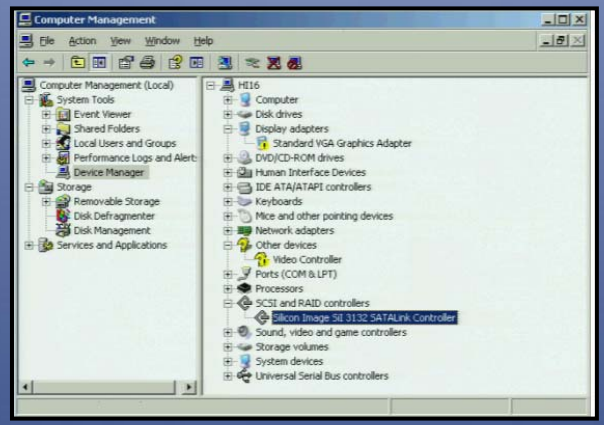
- Drivers

Name	Size	Comments	Date
3132_x86_1.0.22.1_logo_SS4200-E.zip	131K	*Silicon Image driver for onboard eSATA controller.*	11/1/2007 10:45:42
PRO2KXP.exe	11994K	*Intel driver for onboard gigabit Ethernet controller.*	6/26/2007 15:21:54
SS4200-E_ SIO_GPIO_Drivers_v1_2.zip	1407K	*SIO and GPIO drivers. Required to run Intel Hardware Monitor (install first).*	1/18/2008 11:14:49
STOR_ALL32_F6FLPY32_7.5.0.1017_PV_SS4200-E.zip	204K	*Intel driver for ICH7R. This driver is used during WHS installation only. After the first installer reboot hit F6 and load this driver from a USB floppy device. Do not load this driver during the previous section of the installer.*	10/23/2007 13:48:22
infinst_autol.exe	701K	*Intel driver for Helena Island 945GZ/ICH7R chipset.*	6/26/2007 15:20:20

Installation Cont…



Once the driver is updated, Device Manager will show the following window:



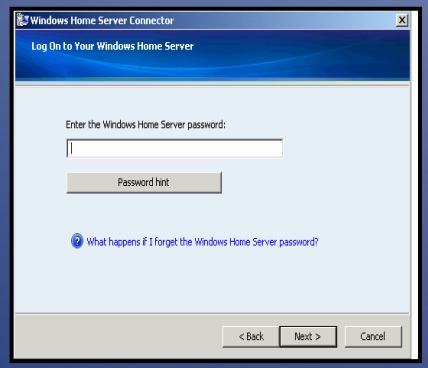
You can ignore the Video Controller

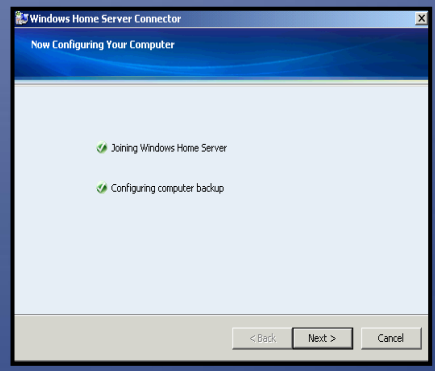
Installation Cont…

- In order for your client/s to comunicate with the Windows* Home Server you need to install the Windows Home Server connector

- Once the WHS system is detected and you have logged in the following window should appear and the software will go through

- "Joining WHS and Configuring computer backup" steps.





Installation Cont…

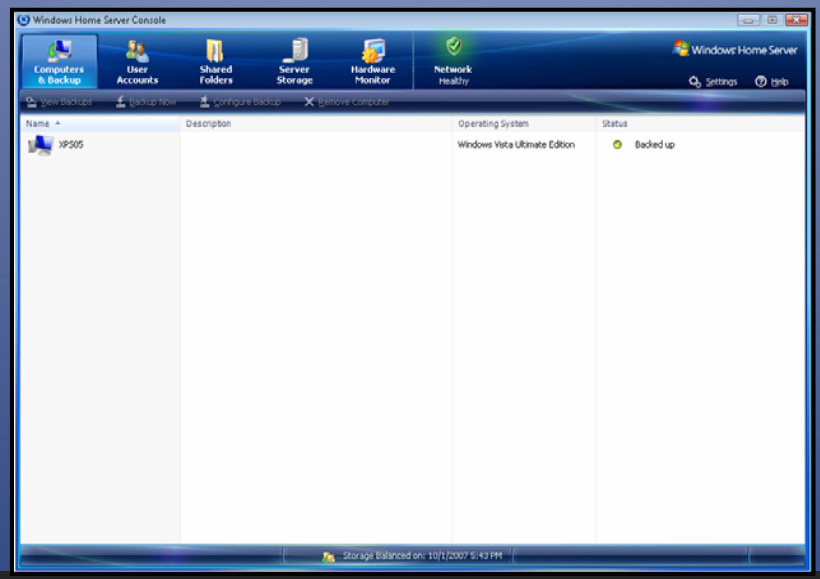
- Hardware Monitor

  Intel has developed an add-in application that will enable the SS4200-E system running Microsoft Windows Home Server to toggle the LEDs on the front of the chassis.

  The Hardware Monitor must be installed from the client interface after the ‘Windows Home Server Connector’ software has been installed on the client. To install the Hardware Monitor copy the installer (iWHMinstaller.msi) to the SS4200-E WHS shared folder called ‘software->Add-ins’.

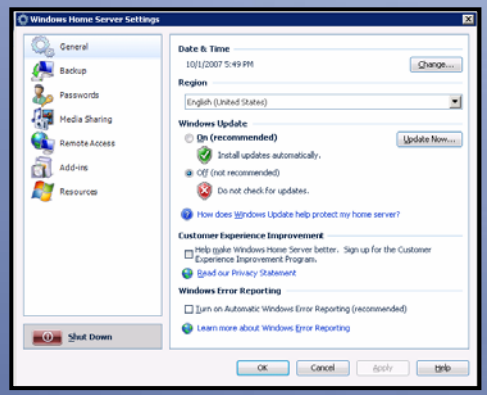
  Open the ‘Windows Home Server Console’ from the WHS desktop.

  Click on ‘Settings’ in the upper right of the console window.

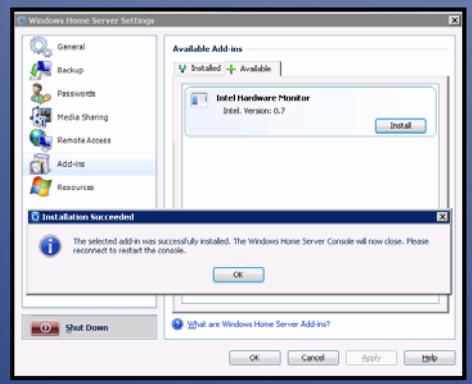


Installation Cont…

- After clicking on ‘Settings’ in the upper right the following window should appear.

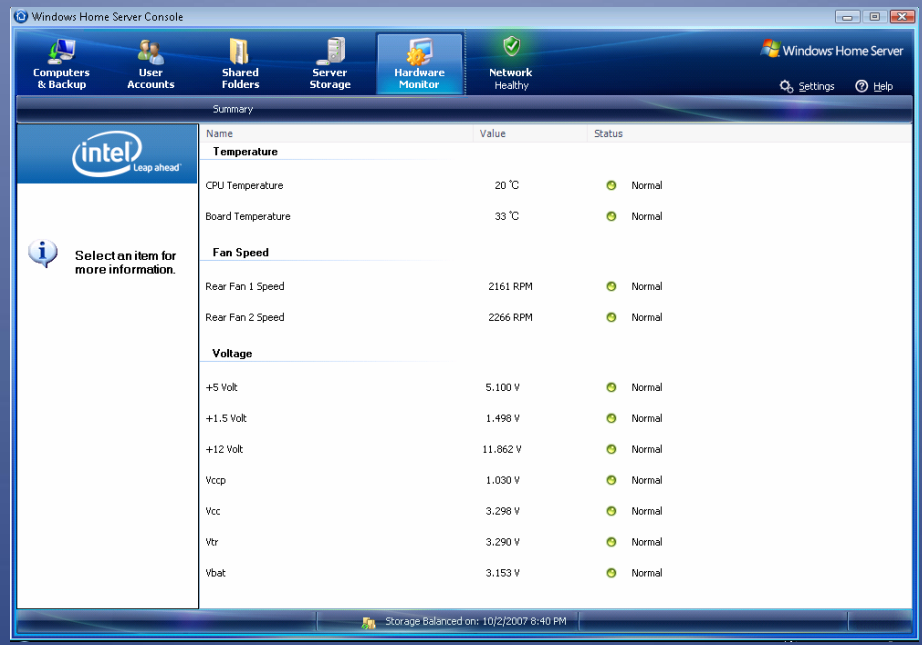


- Select <Add-ins> in the left pane of the window



Installation Cont…

- From <Available Add-ins>, ‘Intel hardware Monitor’ will show, select <Install>. An ‘Installation Succeeded’ message will pop up after installation has completed.
- Open ‘Windows Home Server Console’ from the WHS desktop, Key in your password, our example ‘Pa88word’, and select the Hardware Monitor tab that should now be visible across the top of the window. You will be able to see all system status and the window should be similar to what is shown here.



Windows Home Server

Share

- Access your files from inside and outside your home
- Connect to your home computers from anywhere
- Share photos and videos with friends and family
- Personalized Internet Address helps you and friends/family easily connect to your Windows Home Server
- Stream Media to your XBOX 360

Protect

- Automated daily PC backup creates a full-image backup of your PCs every day
- Simple to restore an entire PC or individual files and folders
- Monitor the health of PC's on your network
- Shared Folder duplication via Windows Home Server Drive Extender
- Snapshots of Shared Folders to enable users to restore previous versions

Store

- Easy & Seamless experience between your PCs and Windows Home Server
- Centralized storage of your digital "stuff"
- Media Hub for your files

Grow

- Expandable storage grows as your needs increase
- Re-purpose your external hard drives
- Additional software solutions and services built by our partners
- Upstream and downstream opportunities: digital cameras, XBOX, Zune, etc.

SS4200-EHW

SUMMARY

Where to find more information…

- http://www.intel.com/products/server/storage/
  - Product Briefs
  - Technical product specifications
  - Spares/Parts list & Configurations Guides
  - Trusted Hardware and OS list
  - Product Animations
  - Hardware & Software user guides
  - …
- Contact your Intel authorized distributor or Intel sales representative

Summary

- Storage market continues to be a tremendous growth opportunity
- Intel® SS4200-E is a bottom-up designed storage product, with 3 year Intel warranty.
- Intel® SS4200-E acts as a supplementary product to your current server and desktop sales
- Intel® SS4200-E(HW) allows you to offer a customized solution for your customers

SS4200-EHW

(Hardware & Software version)

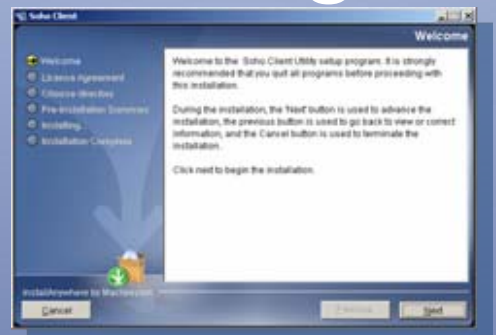
Overview

- Complete solution:
  - SS4200E storage device hardware
  - Integrated OS & EMC* software (DOM)

- 3 Easy steps setup:
  - Install the Storage System Manager & EMC* Retrospect software on client PC
  - Connect SS4200-E to network
  - Run Device Setup Wizard
    - Define adminstrator
    - Configure system

Step 1: Install Storage System Manager

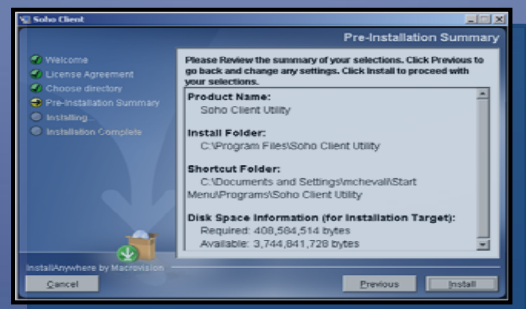
❶ Select Language



❷ Hit Next at Welcome Screen

❸ Accept the License

❹ Select Directory

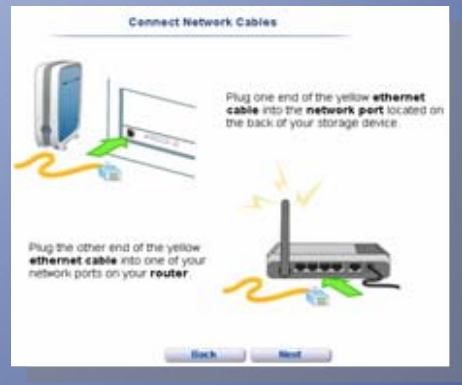


❺Hit Install at Summary Screen

❻ Reboot System

Step 2: Connect SS4200-E in Network

❶ Run SOHO Client SW



❷ Connect the storage system to the network

❸ Connect the power cord

❹ Power on device

Step 4: Run Device Setup Wizard

❶ Enter Admin Name/PWD

❷ Enter Device Name

❸ Enter Admin email address

❹ Date and Time

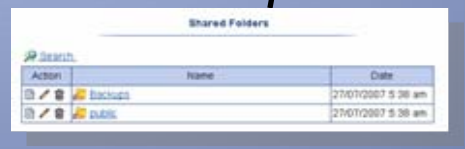
❺ Setup Complete

Administrator System Navigation

Home | Dashboard | User Accounts | Shared Folders | Settings

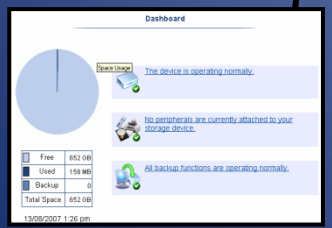
- Add users and Folders
- Connect to Printers and Folders
- Backup and Restore
- Setup Device

- Create New User Accounts
- Modify Account Settings
- Enter Passwords
- Set User Access Privileges
- Delete User Accounts



- Create New Folders
- Display Folders
- View Folder Contents
- Edit Folders
- Set Access Privileges
- Upload Files
- Search Content

- Backups
- Content Indexing
- Date/Time
- Device Settings
- Disk Information
- SW Update Web Site (EMC Site)
- Language
- Media Server (uPNP)
- Network Services
- Power Management
- Printers
- SW Upgrades
- USB Storage



- Displays Disk Information
- System Health
- Displays Connected Devices
- Device and Backup Status

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- Additional…

System Installation

Provide an understanding of the network infrastructure installation details of the Intel® Entry Storage System SS4200-E.

Network Infrastructure Considerations

Storage systems are discovered by the Storage System Manager installed on a client PC by multicast User Datagram Protocol (UDP) broadcasts

- UDP queries are sent out every 4 to 7 seconds to discover newly connected devices
- The discovery UDP broadcasts are not “routable”
- The discovery packets are dropped by routers and may be blocked by firewalls or managed switches
- For the storage system to be discovered by a client, it must be located within the same IP subnet as the client system
- The proprietary discovery process will not see other device types, routers printers…

Device Setup Wizard

- Performed on first discovery to configure the device
- Triggered by first client install only (Out Of Box)
- Create first Admin account
- Set name of storage device
- Configure email notification
- Configure time
    - Time zone
    - NTP server
- Create 2 shared folders: ***Backup*** and ***public***
- Connect (map) ***Backup*** and ***public*** to client

Note: Subsequent discoveries will only perform the last step

Discovery with DHCP server present on LAN

- **Storage device responds with its IP address and name**

Hello?

192.168.1.15

My name is Storage
IP addr 192.168.1.100

Storage 1
192.168.1.100

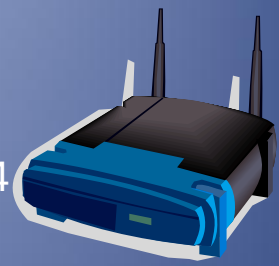
Hello?

192.168.1.16

My name is Storage2
IP addr 192.168.1.101

Storage2
192.168.1.101

LAN:
192.168.1.X/24



Successive storage systems will be discovered as Storage, Storage2, Storage3…

If a discovery / configuration changes the name, this name will be provided on following discoveries

Discovery with no DHCP server present on LAN

Hello?
2nd discovery

192.168.1.15

My name is Storage
My IP address is 192.168.1.100

IP address invalid for LAN, device unreachable prompt user for input

Hello? 1st discovery

192.168.1.16

Storage

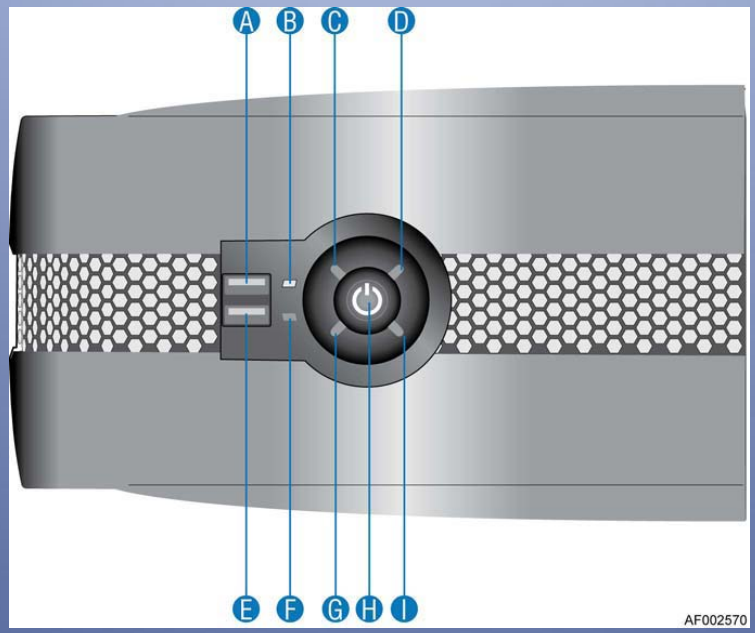
Set IP address to 192.168.1.100

My name is Storage
My IP address is 169.254.1.67

System LED Indicators

Describe the system LEDs and their use as a troubleshooting aid

Front Panel LEDs



A	USB Port 0	F	NIC Activity LED
B	Disk Drive Activity LED	G	Disk Drive 1 Status LED
C	Disk Drive 2 Status LED	H	Power/Status Push-button
D	Disk Drive 3 Status LED	I	Disk Drive 4 Status LED
E	USB Port 1		

Front Panel LED Statuses

LED	Color	Definition
Power/Status Pushbutton LED	Constant blue	Power present. System is booted and operational
	Flashing blue	System is in process of booting up
	Amber	A critical or non-recoverable condition has occurred
	Off	System is off. No power present
NIC Link* **Note:** Rear Ethernet port provides standard link and port activity LEDs	Constant/flashing blue	Indicates an active Ethernet connection
	Off	No active Ethernet connection
Global Disk Drive Activity LED	Constant blue	Activity is present on any disk drive
Disk Drive Status	Constant blue	Indicates the drive is available
	Constant amber	Indicates a drive fault has occurred
	Flashing amber/blue	Indicates the drive is rebuilding
	Off	Disk drive is not ready or not present

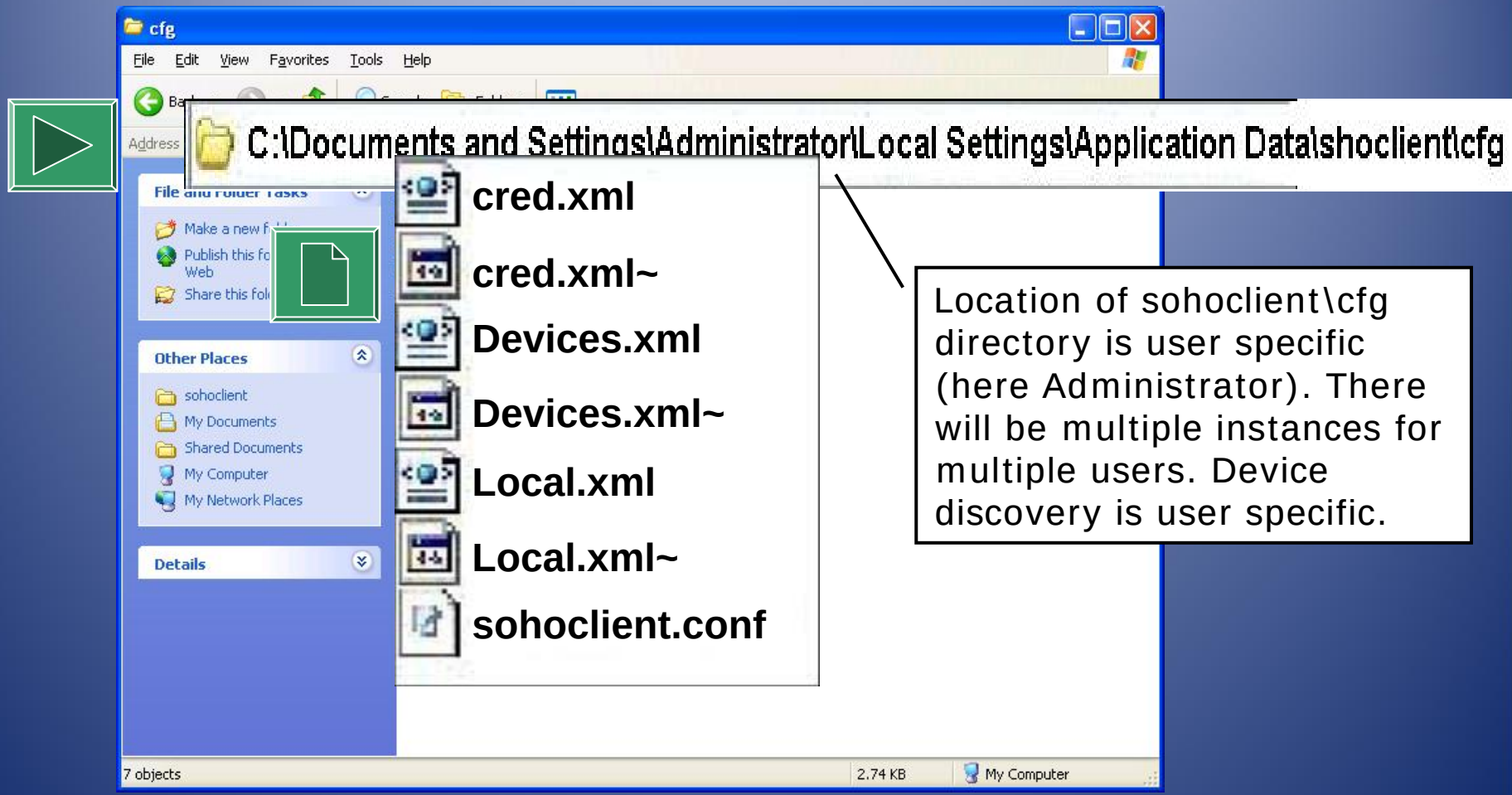
Critical or non-recoverable status condition triggers:

- For EMC SW v1.0 the system status LED will be amber for a RAID or disk failure only
- In EMC v1.1 this will expand to include thermal, fan and voltage conditions:
- Thermal sensors
  - Internal CPU thermal sensor
  - Thermal sensor on the baseboard near the north bridge
- Fan speeds (not operating)
  - The power supply fan is not monitored
- Power Supply voltages

Discovery Configuration Files

Investigate the discovery configuration files stored on the client. Use these to troubleshoot a discovery issue

Configuration files stored on client



Note: Files ending in the tilde (~) are "backup" files. They are the files prior to the last update. Files without the tilde are current files.

Xml files

Devices.xml is updated every time discovery is run. Device discovery runs in the background every few seconds. If you connect a new device, it is discovered within a few seconds and is listed in the list of devices found in the devices file and in the devices listing in the WebUI.

cred.xml is written the first time you login to the device. The credentials will be used whenever you click on the device again in the storage manager UI. There will be one entry per user's login per device.

For a clean re-detection, remove the files Devices.xml and cred.xml. Storage system will be redetected in a few seconds (Devices.xml created) and you will need to login to the storage device (cred.xml created)

Devices.xml file information

- **List of discovered devices**

```
<Devs>
<Device Id="001517319930"
Name="storage"
desName="Intel Entry Storage System Device" Address="192.168.1.125"
MacAddress="00:15:17:31:99:30"
NetMask="255.255.255.0"
ClientAddress="192.168.1.103" ClientNetmask="255.255.255.0"
ClientExpected="4"
ClientMinimum="4"
Init="1"
ValidIP="1"
State="5"
IPAccess="0"
</Devs>
```

Devices.xml Cont...

- Device Id = Set to storage system MAC address
- Name = Storage Device Name set at initial configuration (default = "storage", "storage2", "storage3"...)
- desName = Descriptive name set at initial configuration (default = "Intel Entry Storage System Device")
- Address = IP address of SS4200-E
- MacAddress = MAC address of SS4200-E NIC
- NetMask = SS4200-E IP Netmask
- ClientAddress = IP address of Client computer
- ClientNetmask = Client computer IP Netmask
- ClientExpected = Integer used to indicate compatibility between the device software revision and the client software*
- ClientMinimum = Integer used to indicate compatibility between the device software revision and the client software*

* This number doesn't correspond to any specific version information and is incremented arbitrarily when necessary to handle changes in the interaction between device and client. It will not be incremented for minor releases and will always be 4 for software release 1.0 (first production version software) and 1.1 versions.

Devices.xml Cont...

- Init = "1" = Device was initialized at discovery. Admin password created...
- ValidIP = "1" = A valid IP that is reachable by client was found at discovery
- IPAccess = "1" = Device reachable by IP address; "0" = reachable by name
- State = 0-5: system status of the storage system at time of discovery**

** State: Device States 0 - 5:

- 0 = The pre-discovered device could not be discovered currently
- 1 = The device was discovered, but the WebUI (of storage system) can't be contacted
- 2 = The device is in a transitional state (a reboot, for example)
- 3 = The device was discovered and the WebUI is available, but the file system has an error
- 4 = The device was discovered and the WebUI is available, but the file system is rebuilding
- 5 = The device is fully available, including the storage area on the device

cred.xml

- **Record of login credentials:**

```
<Credentials>
<User OSLogin=“Administrator">
<Content CurrentDevice="001517319930">
<Device Id="001517319930"
Password="1SX8e//4JA=="
IsAdmin="1"
Login="admin"
IsConnected="1">
</Device>
</Content>
</User>
</Credentials>
```

cred.xml Cont…

- **Record of login credentials**
- User OSLogin = User login ID to client system operating system
- CurrentDevice = MAC address of storage system
- Device Id = MAC address of storage system
- Password = Encrypted storage device login password
- IsAdmin = Is the current user logged in as “admin”? 1 = yes; 0 = no
- Login = User name used to login to the storage system
- IsConnected = IsConnected indicates whether shared folders were connected to the client computer or not

Client Discovery Troubleshooting

- Add <Root LogLevel="1"/> to the sohoClient.xml file
  - File can be found at \install dir\cfg\sohoclient.xml, by default at C:\Program Files\Intel Entry Storage System\cfg

- Discovery log entries written to a soho<date>.log text file at: C:\Documents and Settings\<user>\Local Settings\Application Data\sohoclient\log directory

Client discovery troubleshooting Cont...

Sample log output
(discovery entries only):

08:33:17[532]: NIC[0]: 10.251.5.57 # 255.255.255.0 # 10.251.5.1 #
00:05:3c:04:03:41
High Rate Wireless LAN Mini-PCI Adapter with Modem II - Packet Scheduler Miniport

08:33:17[532]: NIC[1]: 192.168.1.103 # 255.255.255.0 # 0.0.0.0 #
00:09:6b:e0:5a:95
Intel(R) PRO/100 VE Network Connection - Packet Scheduler Miniport

08:33:25[532]: Discovered 0 devices on NIC[0], 0 duplicates

08:33:25[532]: Discovered 1 devices on NIC[1], 0 duplicates

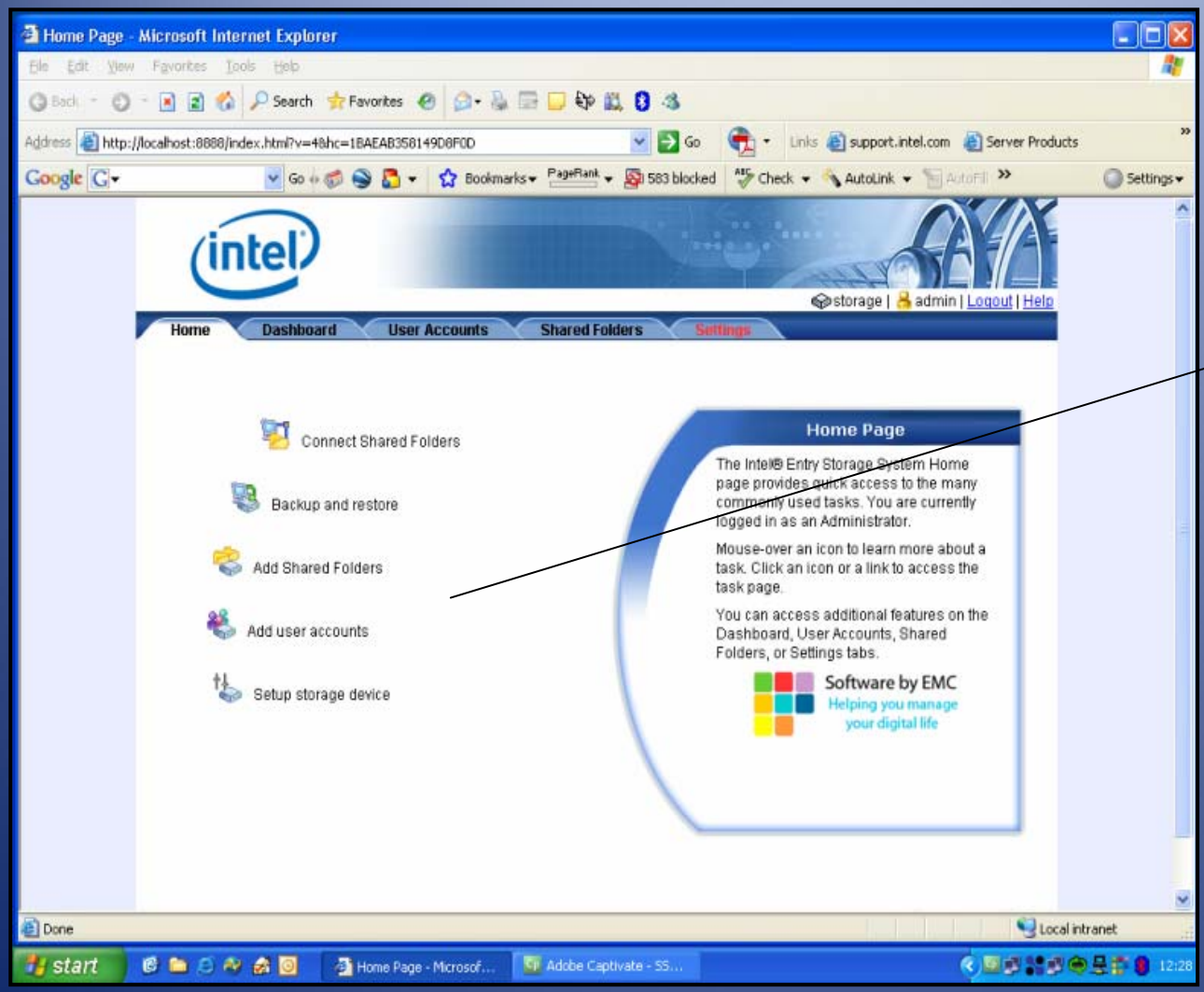
Network adapters found in system

Number of storage systems found on specific network adapter

Troubleshooting With Gather Tool Utility

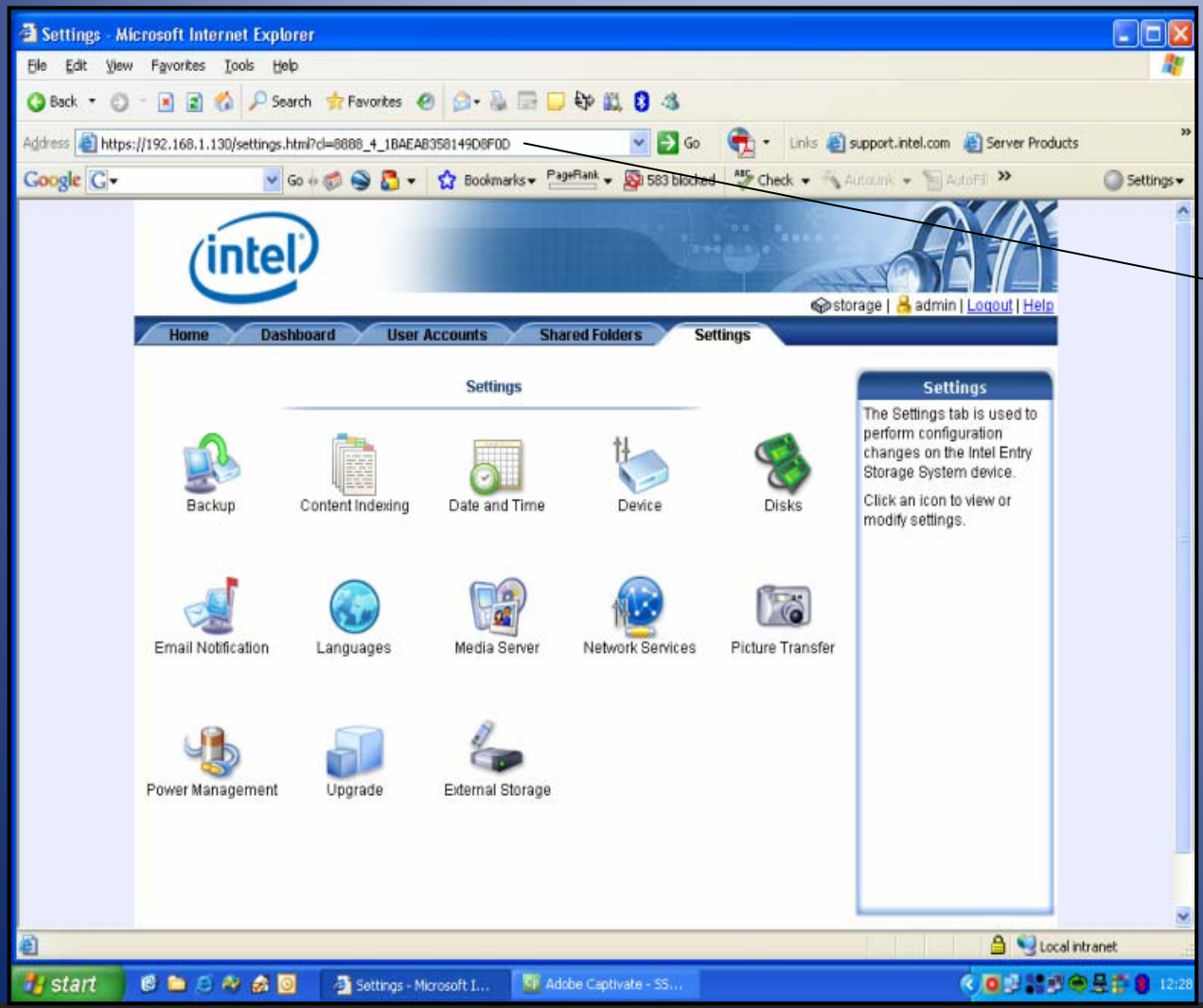
Collect diagnostic files using the System Gather Tool utility for troubleshooting system issues

Acquire System Dump file



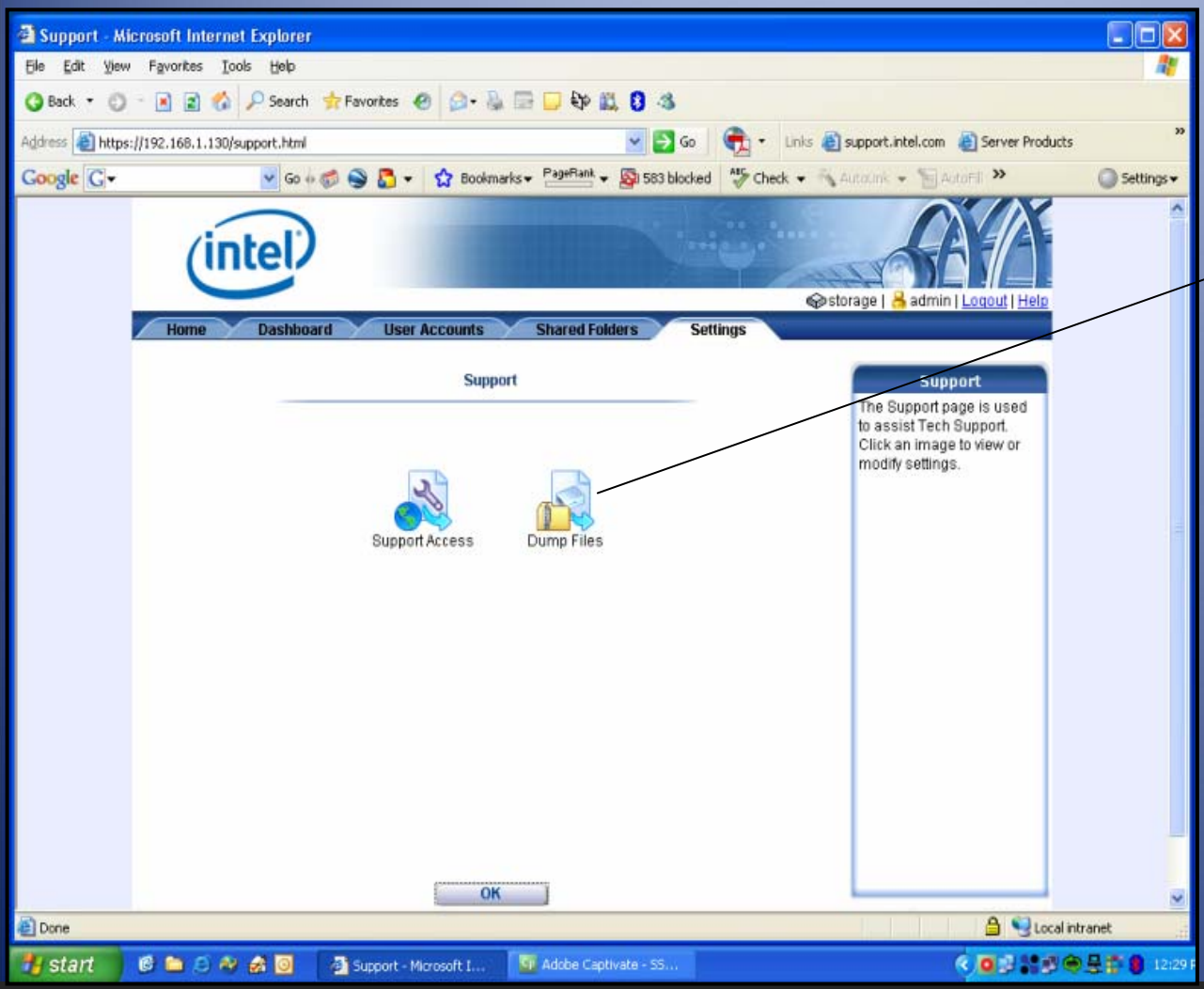
Open Intel Entry Storage System manager and log in if necessary

Acquire System Dump file



Select “Settings” tab and replace the “settings.htmlxxx location with “support.html”

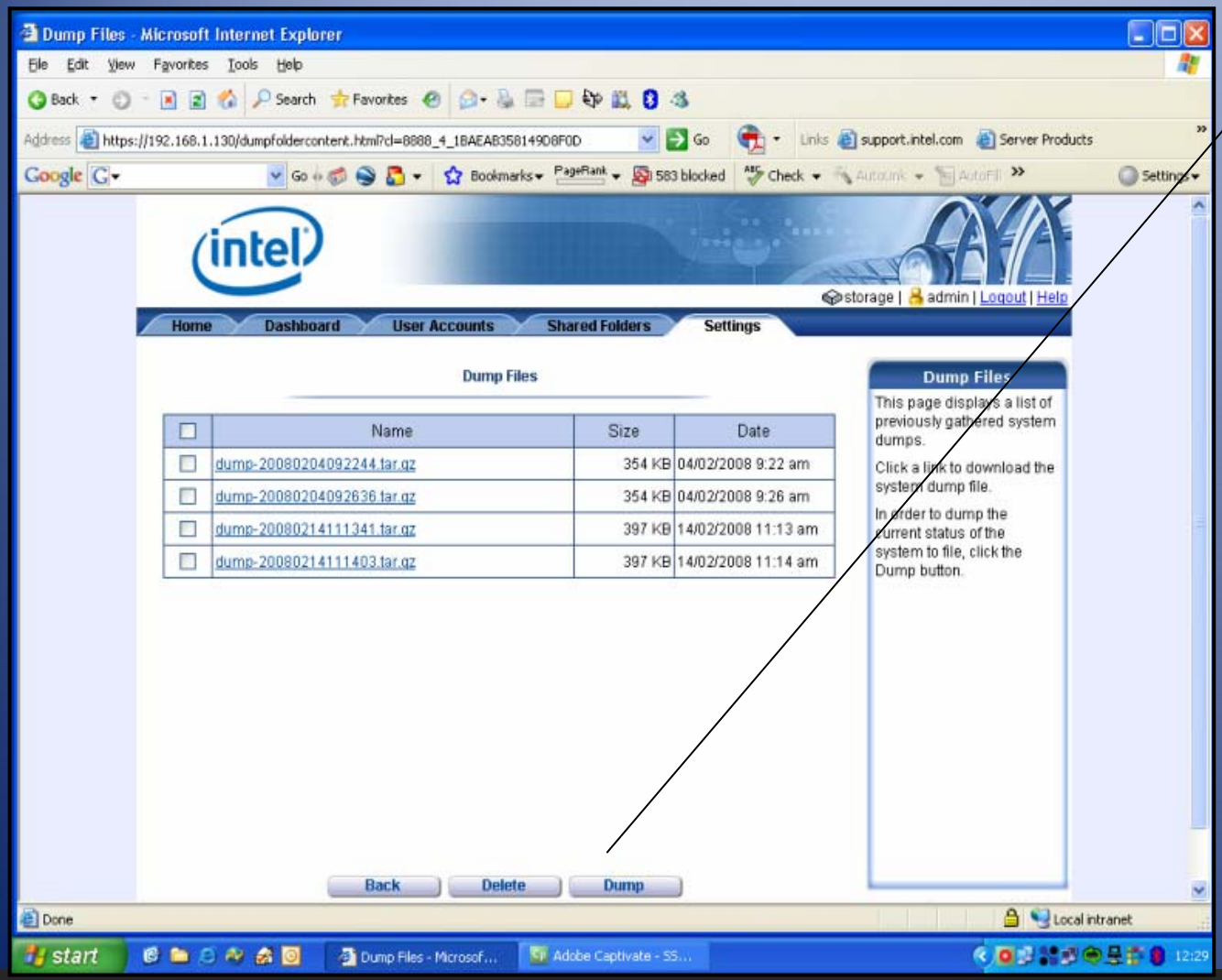
Acquire System Dump file



The “hidden” Support page appears.

Select “Dump Files”

Acquire System Dump file

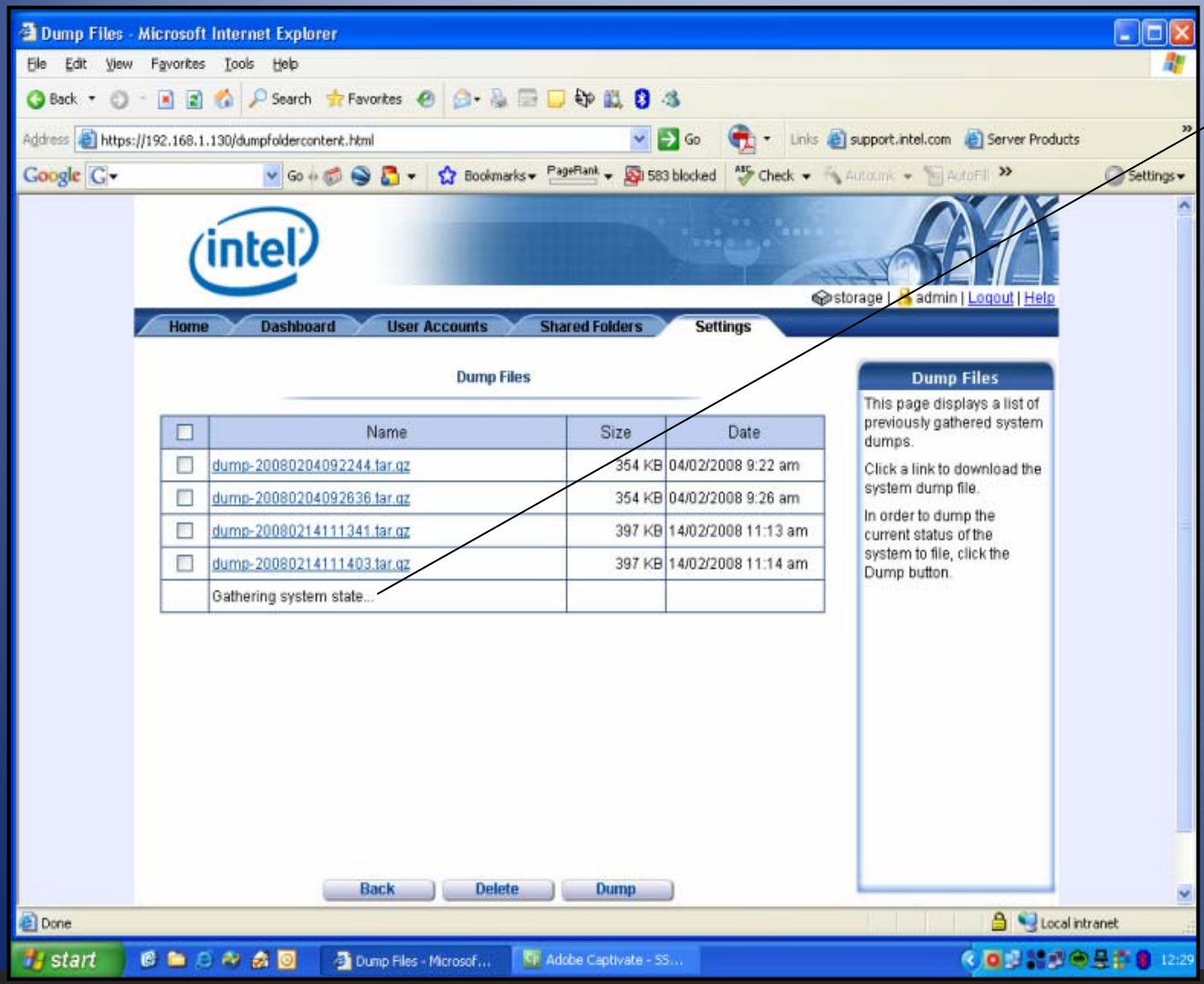


Select “Dump” to create a new dump file with the most recent information

Dump files are created on demand by pressing the “Dump” button

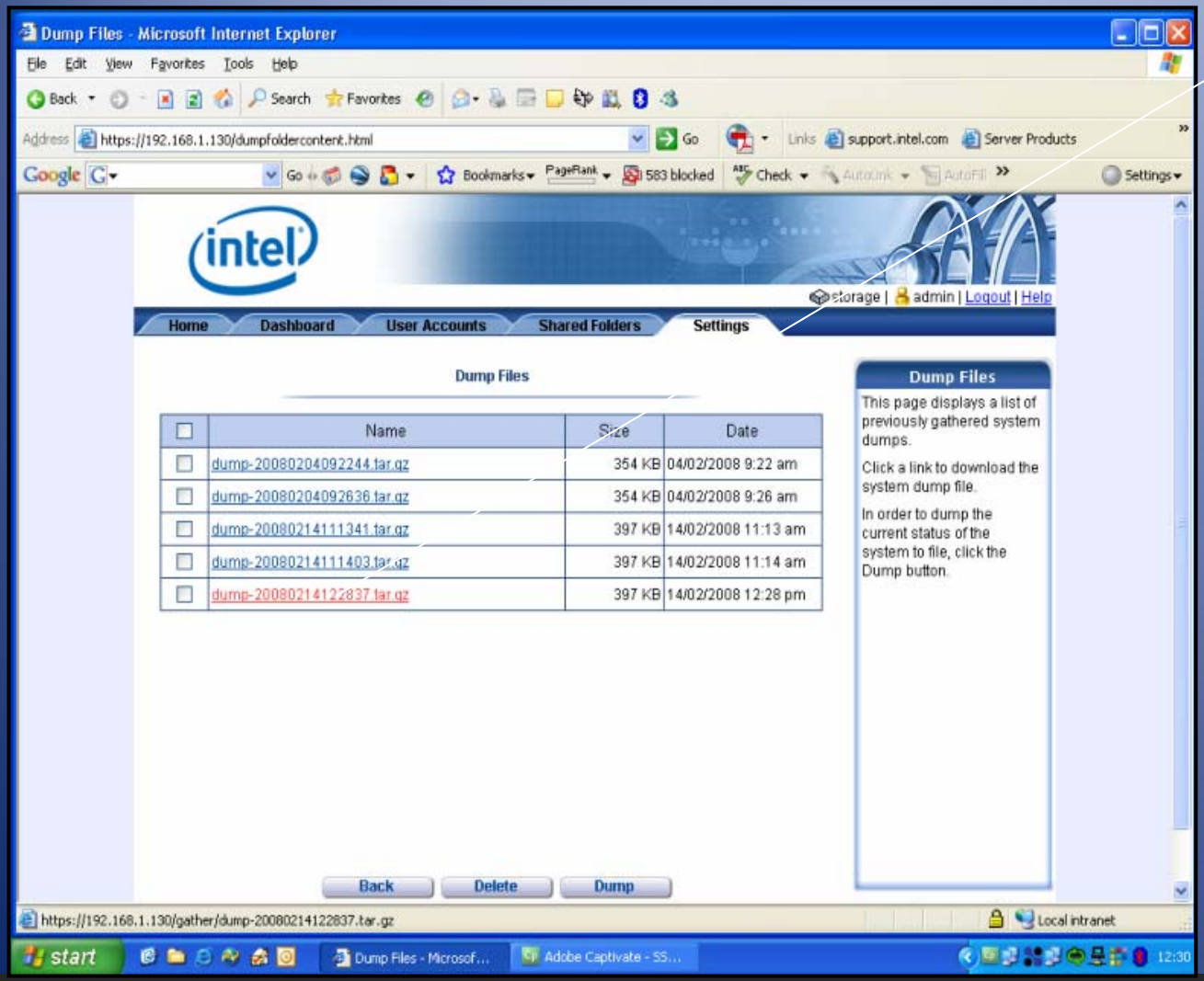
Note: You can select and delete dump files

Acquire System Dump file



System state information is gathered from the storage system

Acquire System Dump file



The new Dump file appears.

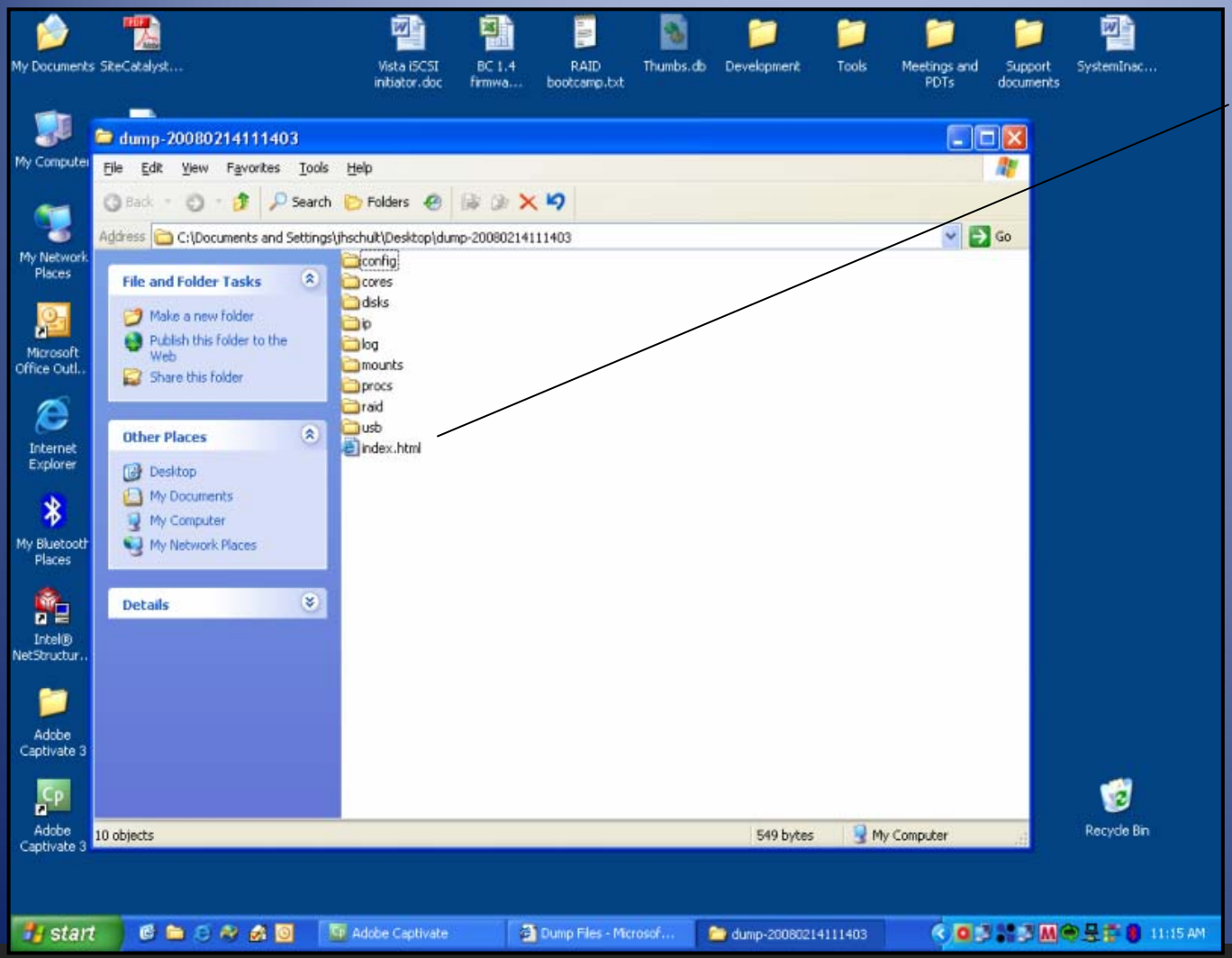
Double-click the new Dump file and save to the local hard disk.

The dump file is saved as a tar.gz compressed file.

Decompress to make the dump file folder available for viewing.

Open the dump file folder.

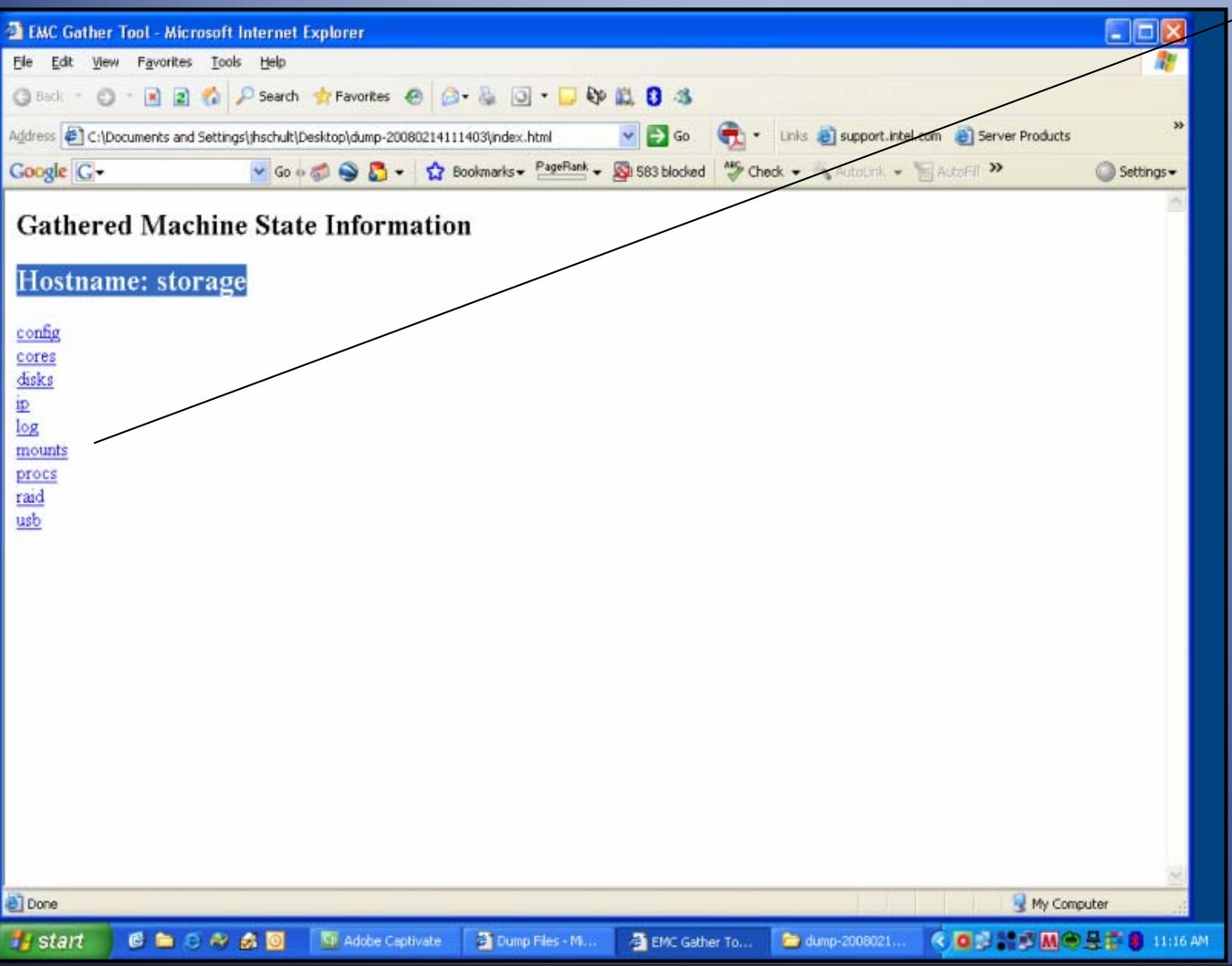
System Dump file



The included Dump files can be viewed with a web browser.

Double-click the parent directory index.html file.

System Dump file



The Dump file folders are available as hyperlinks. Files within these folders are also hyperlinks and can be viewed within the browser.

You may be required to specify the application to open specific file types (.log, .conf, .d...). These are Linux based file types.

For the most part, WordPad is recommended to maintain readable formatting.

System Dump File Information

- **Locations / Files to check for issue troubleshooting**

Config / cfg

sohoFlash.xml - Contains current firmware, language settings and RAID type information

disks

Sdx.info – Disk “x” information

Installed USB drives will appear here as sd?.info and so on following HDDs

ip

ifconfig.out – System network adapter configuration. ifconfig command output

log

messages – System messages log file

soho.log – Log file for general storage (SOHO) device events

sohoaudit.log - Log file for storage (SOHO) device audit events

mounts

index.html - Mount point information from Linux df and mount commands

procs

top.out - List of processes using largest amount system CPU time or memory at time the dump file was created

raid

md0.out - RAID Information from mdadm and mdstat command

usb

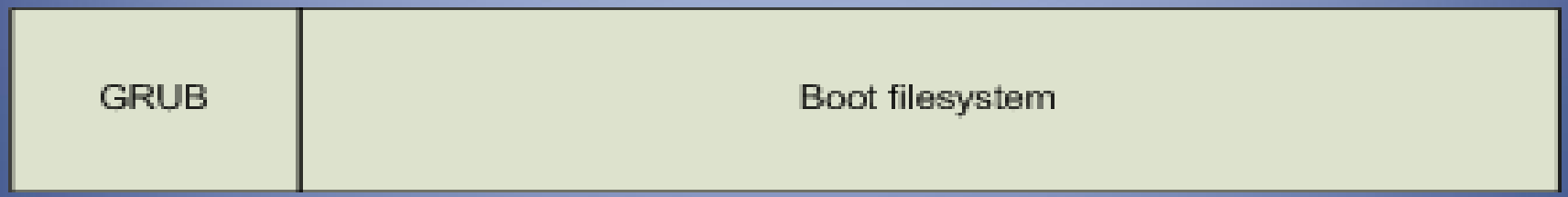
index.html - Detailed information on USB devices. For additional USB Disk information see the "disk"output

System Software Recovery

Recover the system using Recovery Mode to boot to backup image set (last working set)

System Organization

- Helena Island DOM image layout:



- GRUB (Grand unified boot loader)
  - Configured with two boot options, boots primary configuration by default.
  - Boots “recovery mode” configuration when reset button is depressed and held during startup (post-BIOS)
    - Recovery mode boots to a backup image and updates the primary image from backup set

Note: If system restarted from backup image configuration changes made since will not be available. Shares kept on disk will not be affected

Recovery images

- Recovery images are created/updated as part of the upgrade process. The first part of the upgrade process is to update the set of recovery images from the images currently running on the system. This provides a form of immediate rollback to the previous functioning version if the upgrade fails

- New systems have the same primary and backup image

Reset & Recovery

- Reset Button
  - Two functions: reset and recovery.
  - Reset
    - Boot system. When fully booted, press and hold rear panel reset button until power LED begins to blink. System will reset the configuration and reboot
    - Performs configuration reset of the system.
    - Resets administrator password, device name and restores to DHCP mode (IP address reset)
  - Recovery
    - Remove any and all externally attached devices (USB) and reboot system. As system reboots, _immediately_ press and hold rear panel reset button when the front panel LEDs begin to blink. Hold until LEDs turn off (~5 seconds).

Reset & Recovery Cont...

- Reset Button

  NOTE: The recovery function is not necessarily a full superset of the reset operation

  - For example, a successfully recovered system immediately re-imports user information from disk storage, if available, including the admin user and password
  - A user who forgot the administrator password would need must to perform a configuration reset

Active Directory Implementation & Troubleshooting

Understand the Active Directory implementation, features and behaviors on the SS4200-E. Troubleshoot and resolve Active Directory issues

Active Directory Support Overview

- **Based on Samba 3 implementation**
  - The storage device will function as a native domain member server
  - Cannot function as an AD domain controller (Samba 3 limitation)
- **Interdomain trust is not supported**
- **NT domain is not supported**
- **Supports AD organizational units**
  - Organizational units act as a container for objects. Objects can be arranged according to security and administrative requirement in an organization
- **No setup/configuration is required on the domain controller**

Active Directory Features

- AD credentials can be used to login to the storage UI
  - Only those AD users who have successfully logged in to the storage UI or have accessed the storage device from a Windows client will be considered “valid storage AD users”
  - Only such valid storage AD users will be displayed on the users list in the storage UI
  - This is to avoid the unnecessary overhead if only a few users out of thousands of AD users need to access the storage device
  - Hardware reset will force the SOHO device back to Workgroup mode

- Any Windows user in the same domain can access the storage device with AD credentials

- Private folders will be automatically created for each logged in user (to storage device) or any user who accesses the storage device from a Windows client

Active Directory Management Behaviors

- Switching between Workgroup mode and AD mode

- Use storage UI to switch between Workgroup mode and Active Directory mode (Settings > Network Services > Windows File Sharing (CIFS))

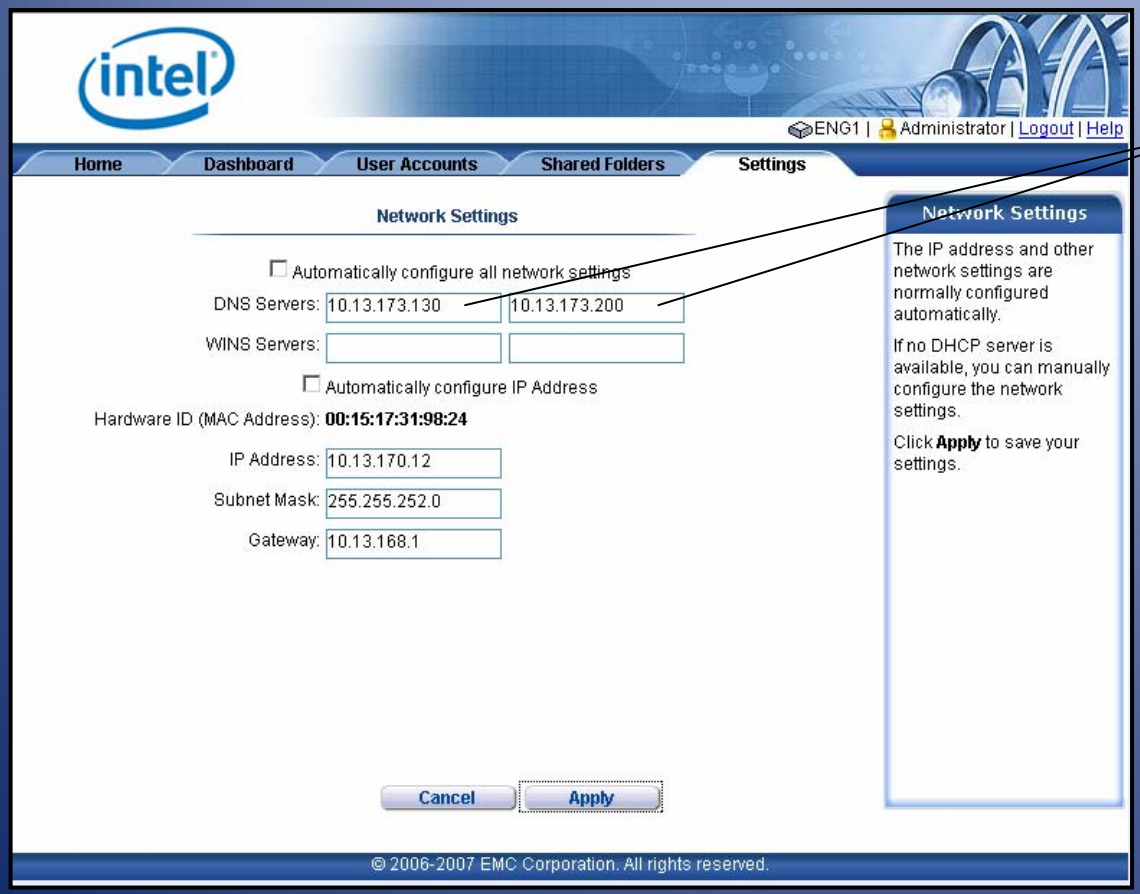
- Workgroup mode accounts will be disabled in AD mode

- Switching between Workgroup mode and AD mode will remove the existing permissions setting of all private folders

- After switching, users with administrative privilege can reassign permissions setting or delete these private folders
    - This is to enable the content of private folders created under one mode to be accessible under another mode
    - In the case of permanent loss of the domain controller, this feature provides a way to recover/delete AD folders under Workgroup mode

Join an Active Directory Domain

Settings > Network Services > Network Settings page of the Storage Manager UI

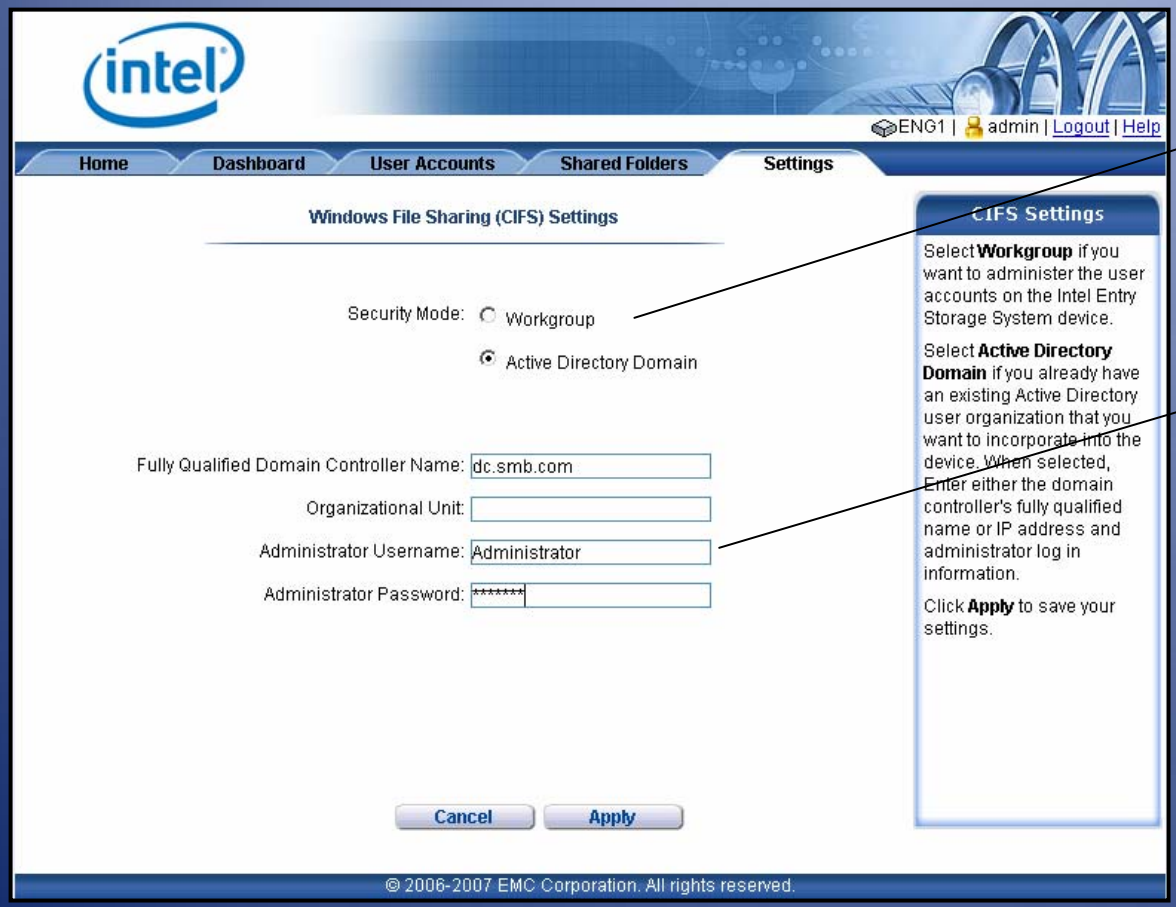


Add the domain DNS server IP address(es)

This can be done manually or automatically from a DHCP server

Join an Active Directory Domain Cont…

Settings tab > Network Services > Windows File Sharing page of the Storage Manager UI

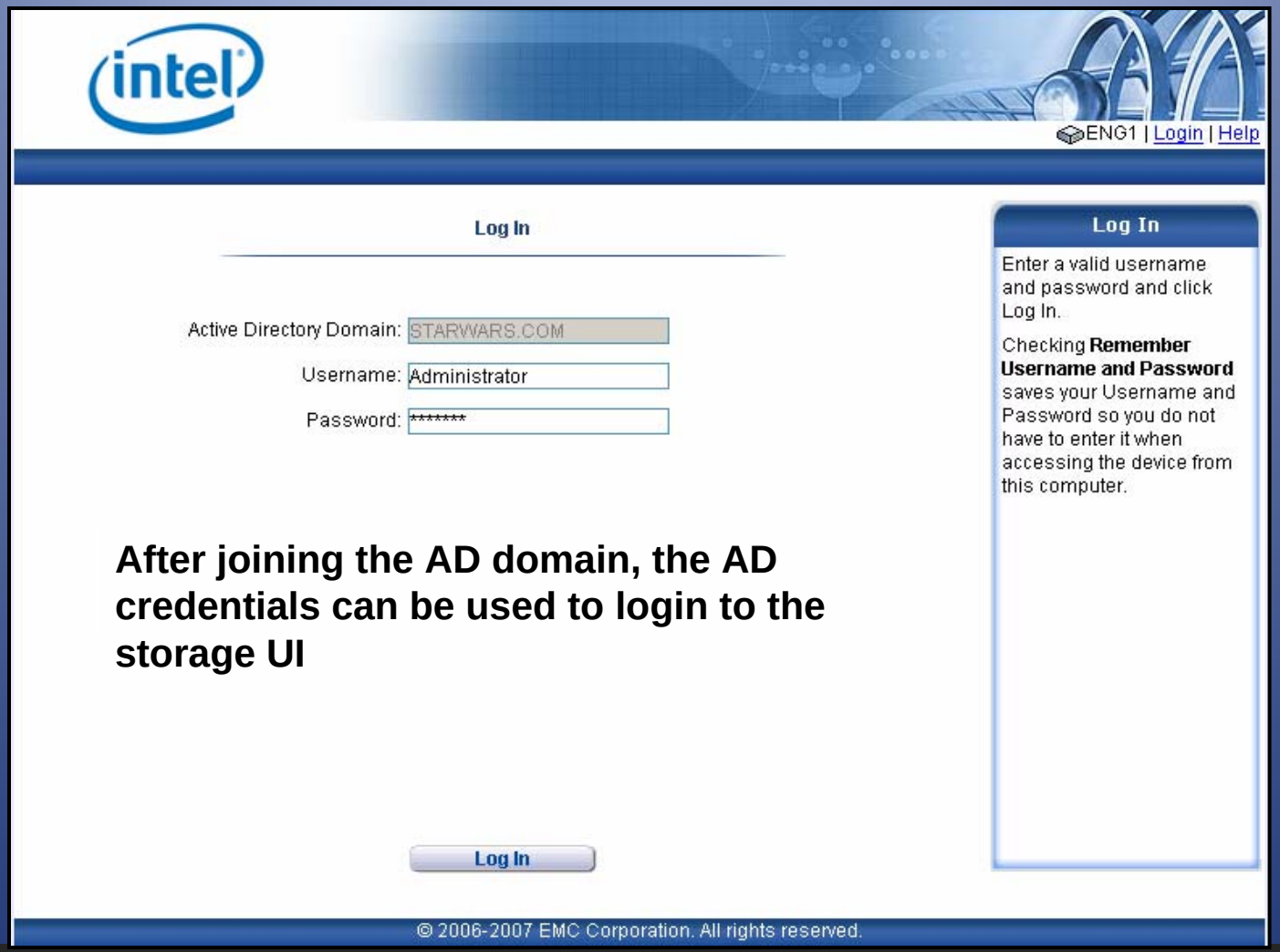


Set Security Mode to Active Directory Domain

Enter the fully qualified name of the domain controller and the credentials of an AD domain admin account

The organizational unit entry is optional

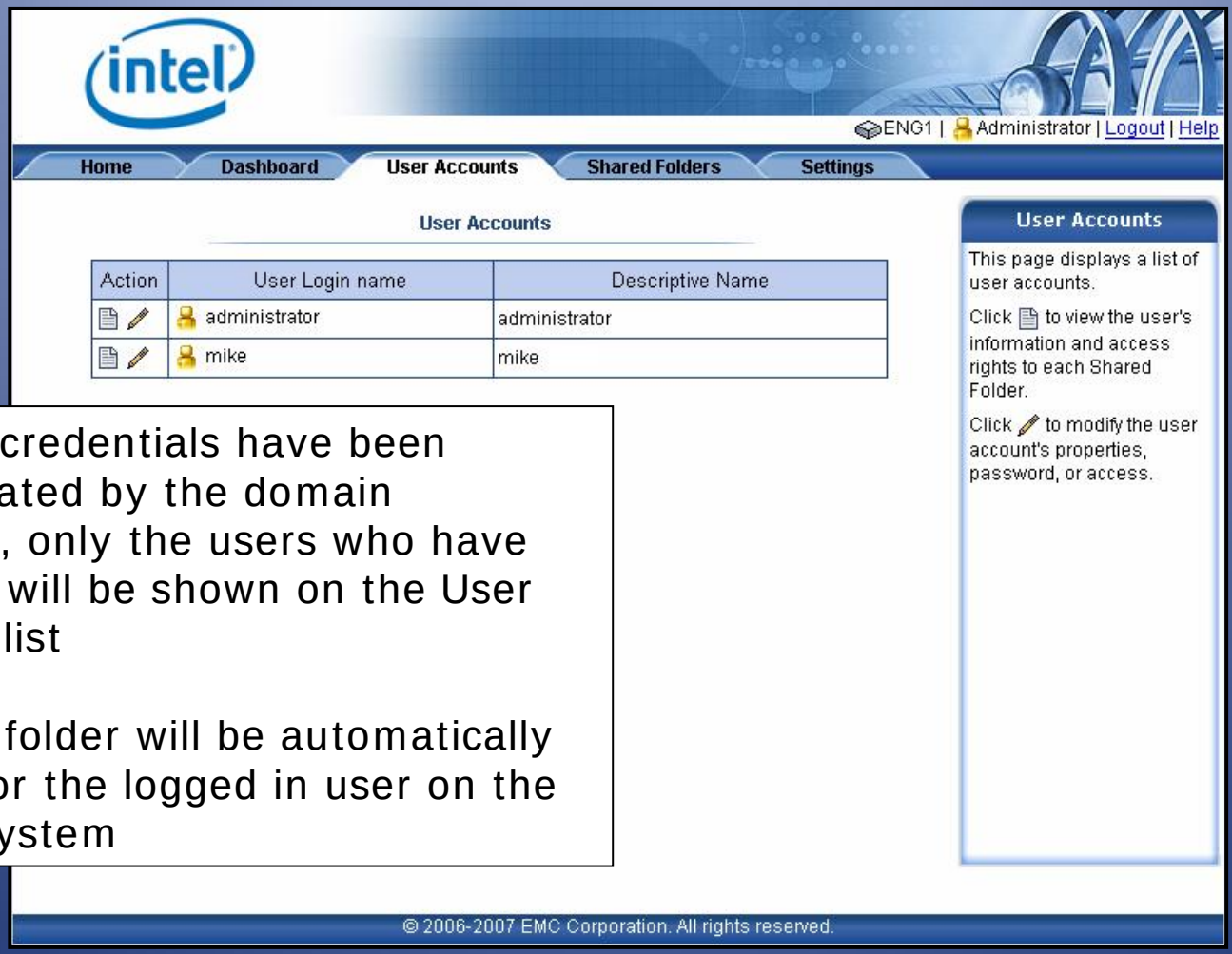
Log in to the Storage Manager UI



After joining the AD domain, the AD credentials can be used to login to the storage UI

Storage Manager UI

User Accounts tab of the Storage Manager UI

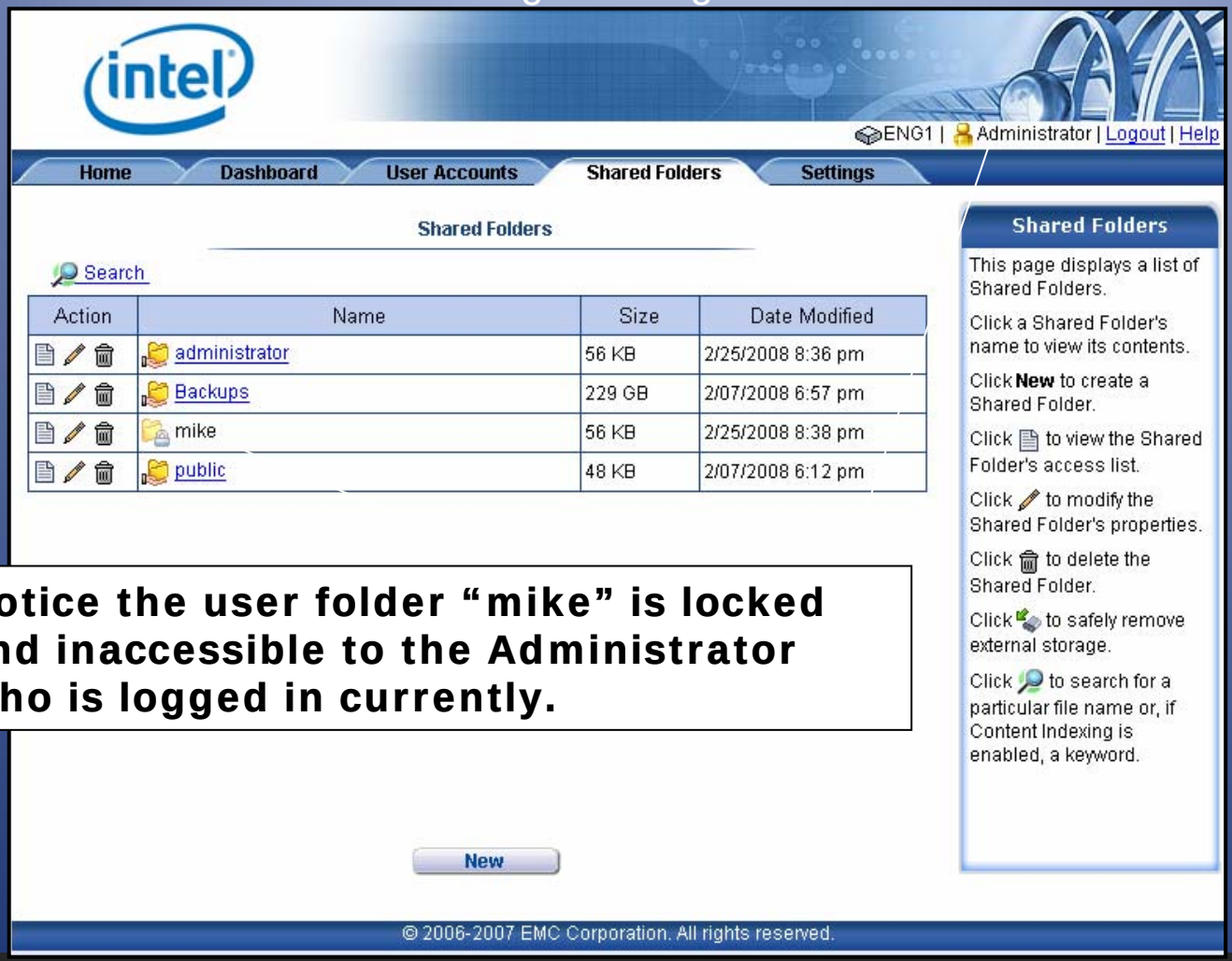


After the credentials have been authenticated by the domain controller, only the users who have logged in will be shown on the User Accounts list

A private folder will be automatically created for the logged in user on the storage system

Storage Manager UI

Shared Folder tab of the Storage Manager UI



Notice the user folder "mike" is locked and inaccessible to the Administrator who is logged in currently.

Troubleshooting Common AD Issues

- No configuration of a working domain DNS server / AD controller is required
- If the storage device is not defined on the DNS server of the AD domain
  - Verify and set Storage Manager UI Network Services under Windows File Sharing (CIFS) Settings are correct
  - "ping" and "nslookup" commands can be used to test name resolution
    - C:\> ping <storage system name>
      - Responds with associated IP address and ping response
    - C:\> nslookup <storage system name>
      - Successful response:

        Server: <Domain DNS server>
        Address: <Domain DNS server IP address>

        Non-authoritative answer:
        Name: <FQDN for storage system>
        Address: <storage system IP address>

        DNS working correctly!

Troubleshooting Common AD Problems

- Storage device does not use the DNS server of the AD domain
  - Verify and set Storage Manager UI Network Services under Windows File Sharing (CIFS) Settings are correct

- Time on the storage device and the domain controller are not synchronized
  - Five minute discrepancy can cause logon requests to be rejected
  - Strongly recommended to use NTP for storage system to synchronize with domain controller
    - Storage Manager UI > Settings > Date & Time
      - Set Automatically synchronize with an Internet time server and specify NTP time server

Additional...

Provides information that does not fit into previous sections

Additional...

- **Failed HDDs:**
  - Will not be reused unless it is removed and reinserted (out for 5 seconds or more), or system power cycled
  - It is recommended not to use a failed HDD again, replace for reliability

- **USB devices:**
  - If multiple partitions exist on USB device, only last partition will be mounted
  - Attached USB and eSATA devices are just gross storage devices, cannot be used as part of RAID

- **Data integrity:**
  - At boot the system always runs a File System Check (fsck) to check for disk errors. If errors are found, it will run another fsck session to repair the problems found in the file system. If this fails, the issue is serious

- **Drive # support:**
  - Array is built depending on HDD number on first boot
  - 2 or 4 drives only supported, nothing else. 2 HDDs - RAID 1. 4 HDDs - RAID 5. After RAID 5 configured, can change to RAID 10.
  - 2 HDDs will not report missing HDD #3 or 4; 4 HDDs will report missing HDD # 1 or 2
  - Cannot expand 2 drive RAID 1 array to 4 drive RAID 5 (or 10) array

- **If existing partitions are detected on disks:**
  - At boot, system will label HDD as foreign. User is prompted to delete data (remove foreign configuration) and then HDD will be added to array.

Additional Cont…

- **Shared folder access:**
  - Only one user access to data permitted at a time to avoid data corruption. Third party devices available to permit (time share/locks)

- **Backup folder Dashboard page usage:**
  - Not just backups, includes anything in backups folder placed there by backups or manual file copy

- **System software upgrades** overwrites existing and adds necessary files to get “new” revision of software.

- **Greater detail provided using Storage System Manager** than generic browser
  - Storage Manager Browser information is received from the Client Web-Server and the Device Web-Server
    - If generic browser used, information from Client Web-Server (AppWeb) is not available

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Thank you for attending!

We remain available to answer questions until 16.30 UKT (17:30 CET)