

APPENDIX A: SUPPORTING FILES

The following table details the content of the Supporting Files provided as part of this Full Disclosure Report.

File Name	Description	Location
/SPC1_RESULTS	Data reduction worksheets	root
		/SPC1_RESULTS
		/SPC1_RESULTS
		/SPC1_RESULTS
		/SPC1_RESULTS
		/SPC1_RESULTS
		/SPC1_RESULTS
		/SPC1_RESULTS
		/SPC1_RESULTS
		/SPC1_RESULTS
/C_Tuning	Tuning parameters and options	root
Tuning was done using CLI (see Appendix C)		
/D_Creation	Storage configuration creation	root
DS4200_volume_map.sh	Create Disk Groups, Volumes and Mapping	D_Creation
/E_Inventory	Configuration inventory	root
/DS4200_BEFORE_log_0712	Configuration before the run	E_Inventory
/DS4200_AFTER_log_0712	Configuration after the run	E_Inventory
/F_Generator	Workload generator	root
SPC1.asu	ASU configuration file	F_Generator
basic_full_run_4200_0712.bat	Execute all test phases exclude PERSIST_2	F_Generator

APPENDIX B: THIRD PARTY QUOTATION

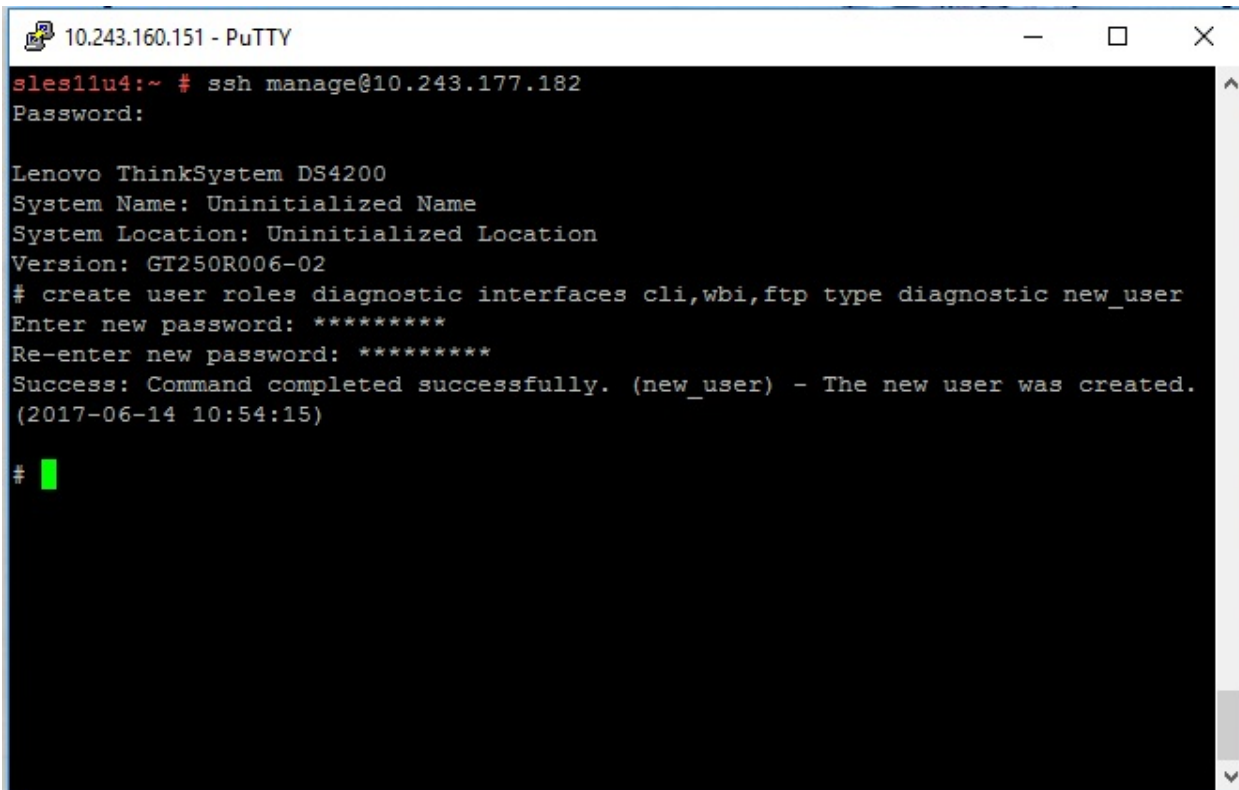
All components are directly available through the Test Sponsor.

APPENDIX C: TUNING PARAMETERS AND OPTIONS

The standard DS4200 Controller CLI was used to apply the necessary tuning parameters for the test.

1. You first must create a user account with the proper privileges to enable the tuning.

2. To do that, login with the manage user account and run the following command:
create user roles diagnostic interfaces wbi,cli,ftp type diagnostic new_user

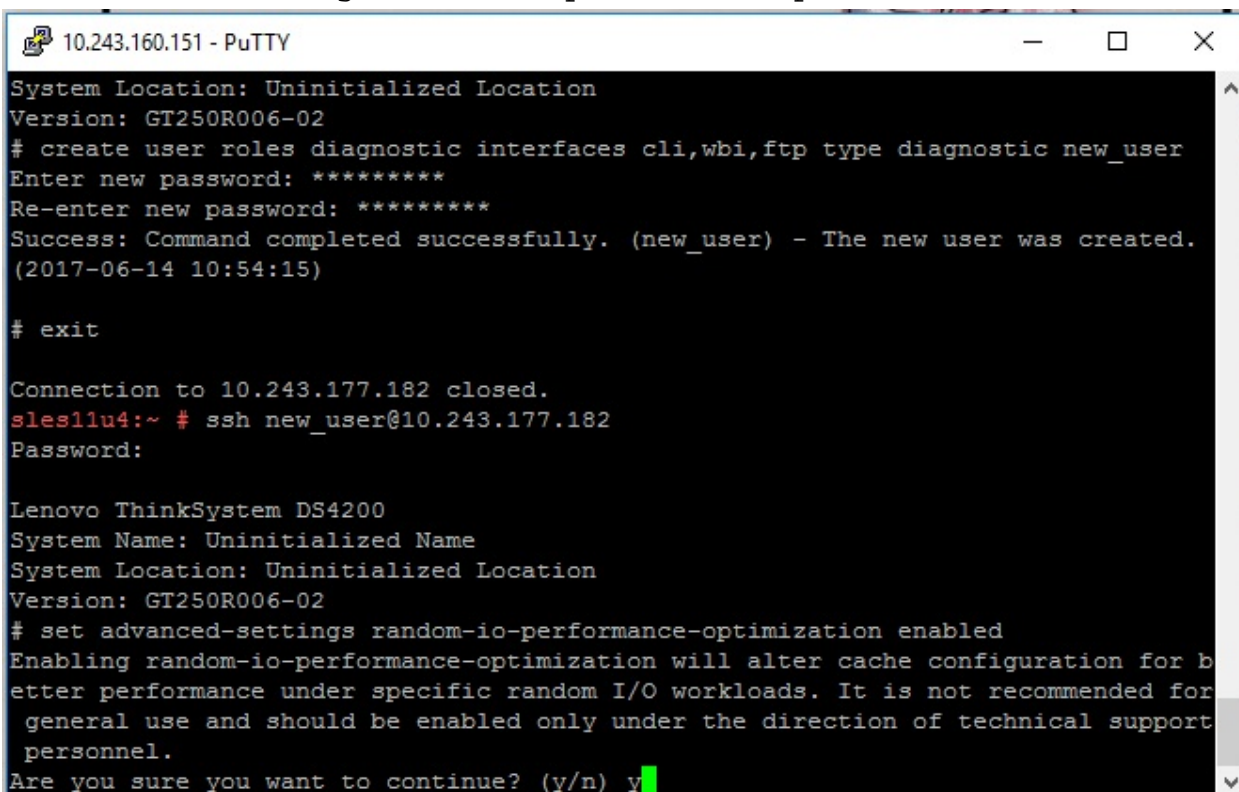


```
10.243.160.151 - PuTTY
sles11u4:~ # ssh manage@10.243.177.182
Password:

Lenovo ThinkSystem DS4200
System Name: Uninitialized Name
System Location: Uninitialized Location
Version: GT250R006-02
# create user roles diagnostic interfaces cli,wbi,ftp type diagnostic new_user
Enter new password: *****
Re-enter new password: *****
Success: Command completed successfully. (new_user) - The new user was created.
(2017-06-14 10:54:15)

#
```

3. Once you have created the user you must login with that user account
4. Then run the following command:
set advanced-settings random-io-performance-optimization enabled



```
10.243.160.151 - PuTTY
System Location: Uninitialized Location
Version: GT250R006-02
# create user roles diagnostic interfaces cli,wbi,ftp type diagnostic new_user
Enter new password: *****
Re-enter new password: *****
Success: Command completed successfully. (new_user) - The new user was created.
(2017-06-14 10:54:15)

# exit

Connection to 10.243.177.182 closed.
sles11u4:~ # ssh new_user@10.243.177.182
Password:

Lenovo ThinkSystem DS4200
System Name: Uninitialized Name
System Location: Uninitialized Location
Version: GT250R006-02
# set advanced-settings random-io-performance-optimization enabled
Enabling random-io-performance-optimization will alter cache configuration for b
etter performance under specific random I/O workloads. It is not recommended for
general use and should be enabled only under the direction of technical support
personnel.
Are you sure you want to continue? (y/n) y
```

5. Disable disk groups background scrub command:
set advanced-settings background-scrub disabled

APPENDIX D: STORAGE CONFIGURATION CREATION

Storage groups and volumes are created using the following script (DS4200_volume_map.sh):

```
ssh manage@10.243.177.182 "add disk-group disks 0.0,0.1:0.2,0.3:0.4,0.5 level
raid10 pool a type virtual; add disk-group disks 0.6,0.7:0.8,0.9:0.10,0.11 level
raid10 pool b type virtual; create volume pool a size 510GB ASU1-A; create volume
pool a size 510GB ASU2-A; create volume pool a size 114GB ASU3-A; create volume
pool b size 510GB ASU1-B; create volume pool b size 510GB ASU2-B; create volume
pool b size 114GB ASU3-B; map volume lun 10 ports A0 ASU1-A; map volume lun 11
ports A0 ASU2-A; map volume lun 12 ports A0 ASU3-A; map volume lun 13 ports B0
ASU1-B; map volume lun 14 ports B0 ASU2-B; map volume lun 15 ports B0 ASU3-B"
```

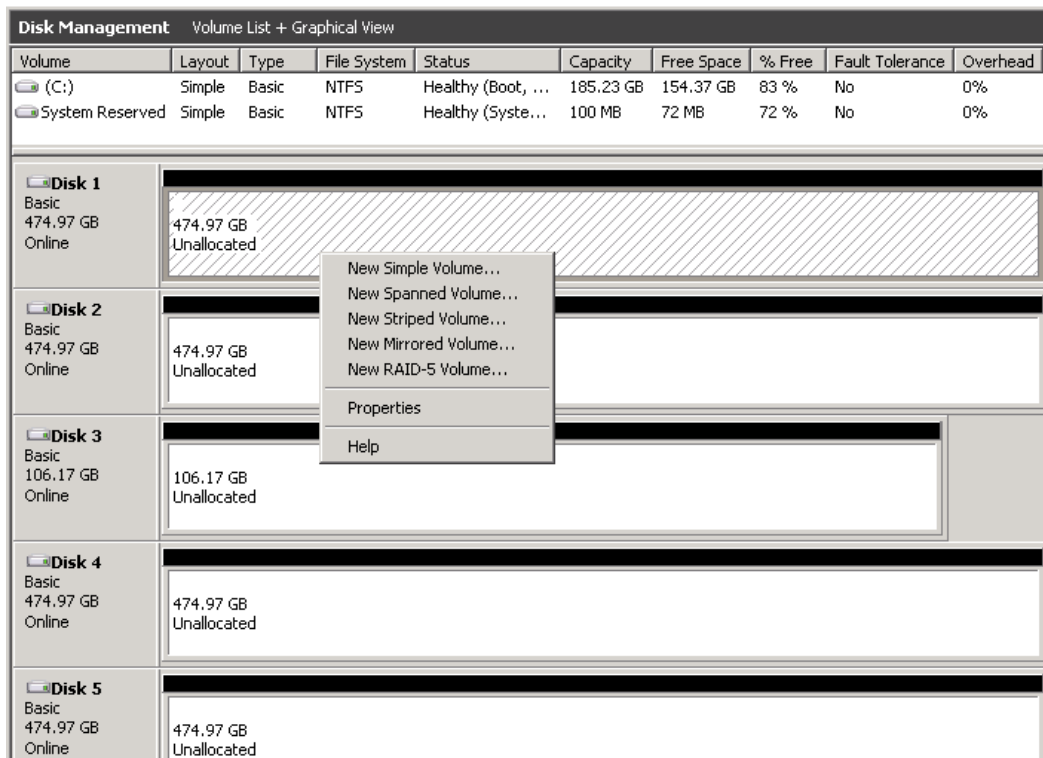
1. The add disk group commands are used to create 2 pools with a single disk group per pool
add disk-group disks 0.0,0.1:0.2,0.3:0.4,0.5 level raid10 pool a type virtual
add disk-group disks 0.6,0.7:0.8,0.9:0.10,0.11 level raid10 pool b type virtual
2. Each Disk group is configured with (6) 400GB SSDs in a RAID 10 layout
3. The create volume commands are used to assign (3) volumes to each of the disk groups configured in step 1
create volume pool a size 510GB ASU1-A
create volume pool a size 510GB ASU2-A
create volume pool a size 114GB ASU3-A
create volume pool b size 510GB ASU1-B
create volume pool b size 510GB ASU2-B
create volume pool b size 114GB ASU3-B
4. The volumes are then mapped to either the A0 or B0 SAS port in the final 6 commands.
map volume lun 10 ports A0 ASU1-A
map volume lun 11 ports A0 ASU2-A
map volume lun 12 ports A0 ASU3-A
map volume lun 13 ports B0 ASU1-B
map volume lun 14 ports B0 ASU2-B
map volume lun 15 ports B0 ASU3-B

The Host will see the Disks after mapping. Make the disks online and initialized.

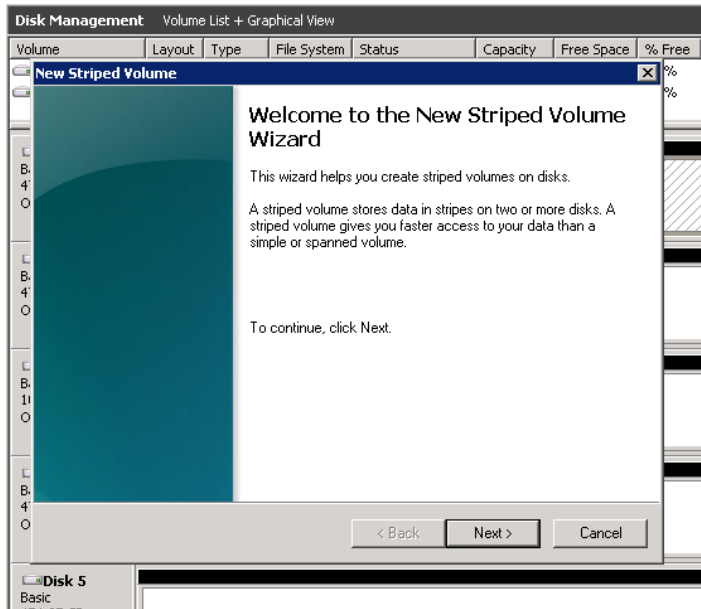
Next, use Windows Disk Management to create the striped ASU volumes.

"Physical Disk"	LUN #	ASU	Drive Letter
1 and 4	10 and 13	ASU-1	I:
2 and 5	11 and 14	ASU-2	J:
3 and 6	12 and 15	ASU-3	K:

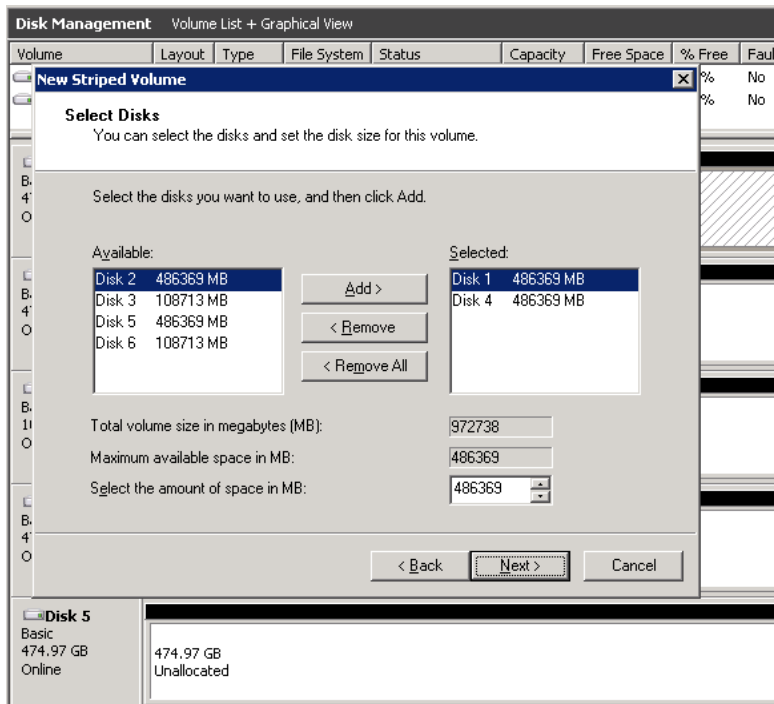
1. Start Disk Management
2. Right click on Disk 1, and select **New Striped Volume...**



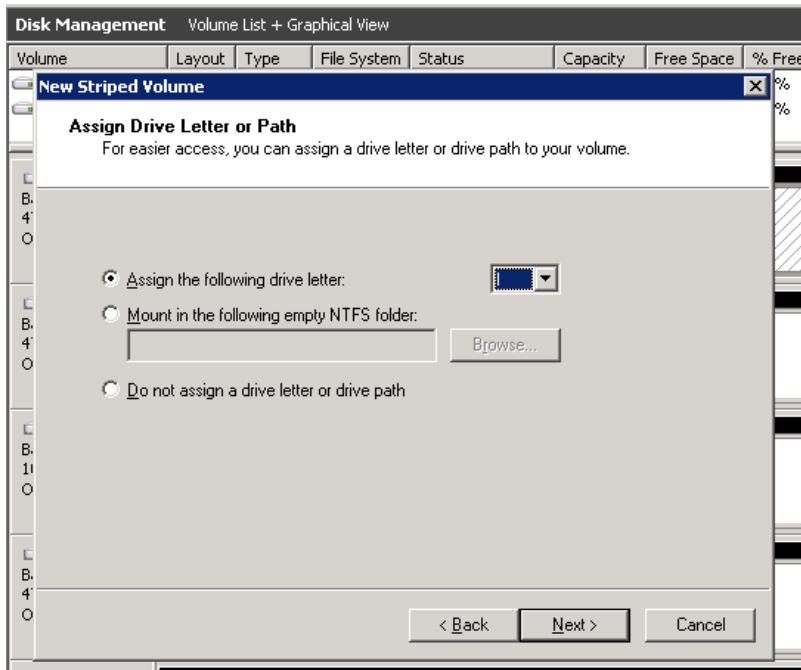
3. Wizard pops up. Select **Next**



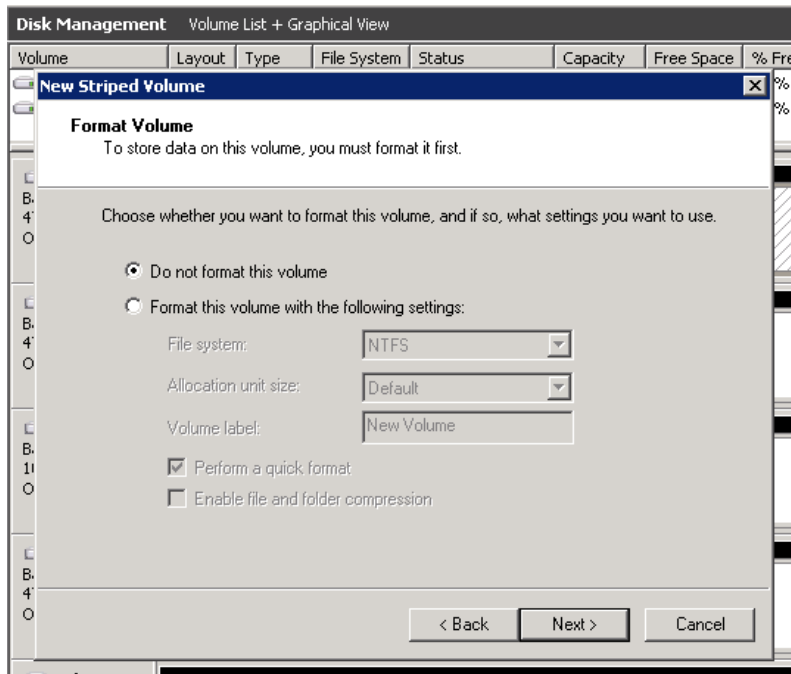
- 4. On **New Striped Volume** window, highlight **Disk 4** and click on **Add>**
- 5. **Disk 1** and **Disk 4** in the selected area, click **Next**



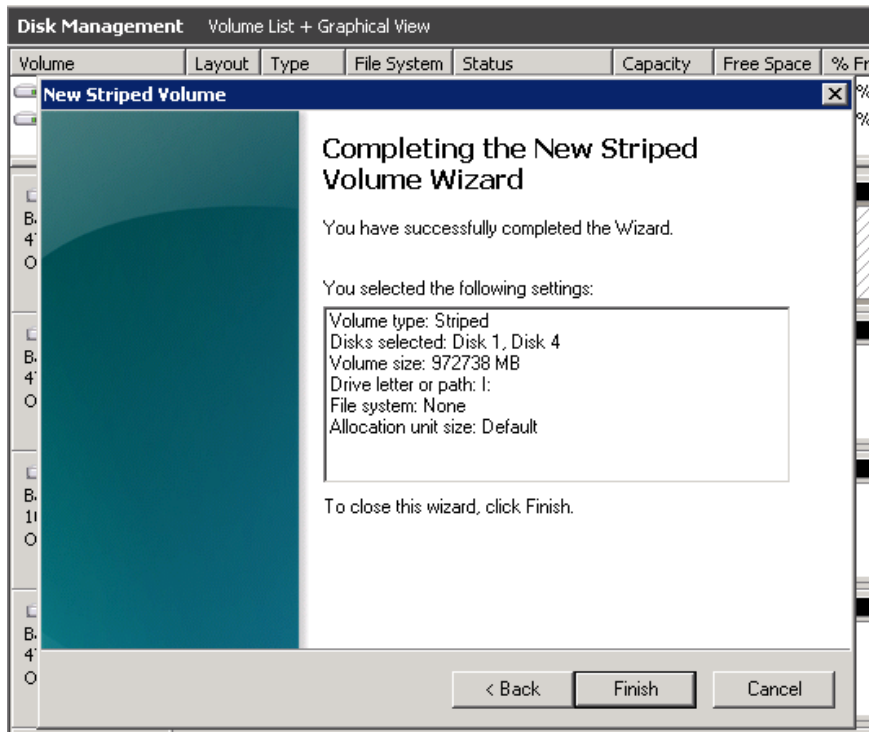
6. Click **Assign the following drive letter**, select **I**, then **Next**



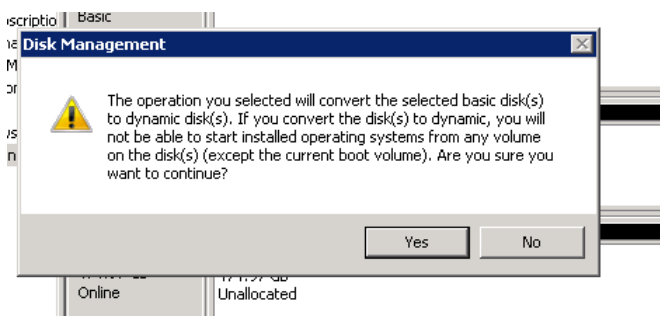
7. On **Format Volume** window, select **Do not format this volume**, then **Next**



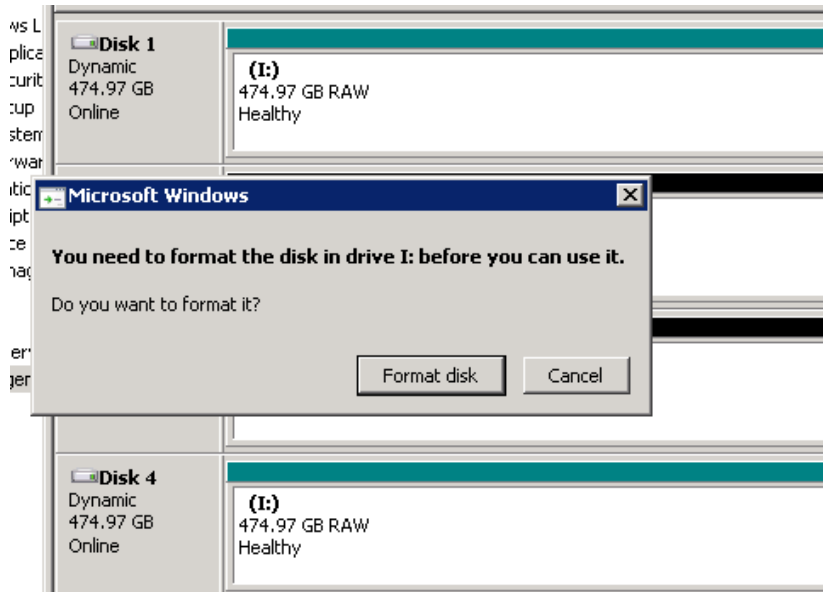
8. Completing the New Striped Volume Wizard, click **Finish**



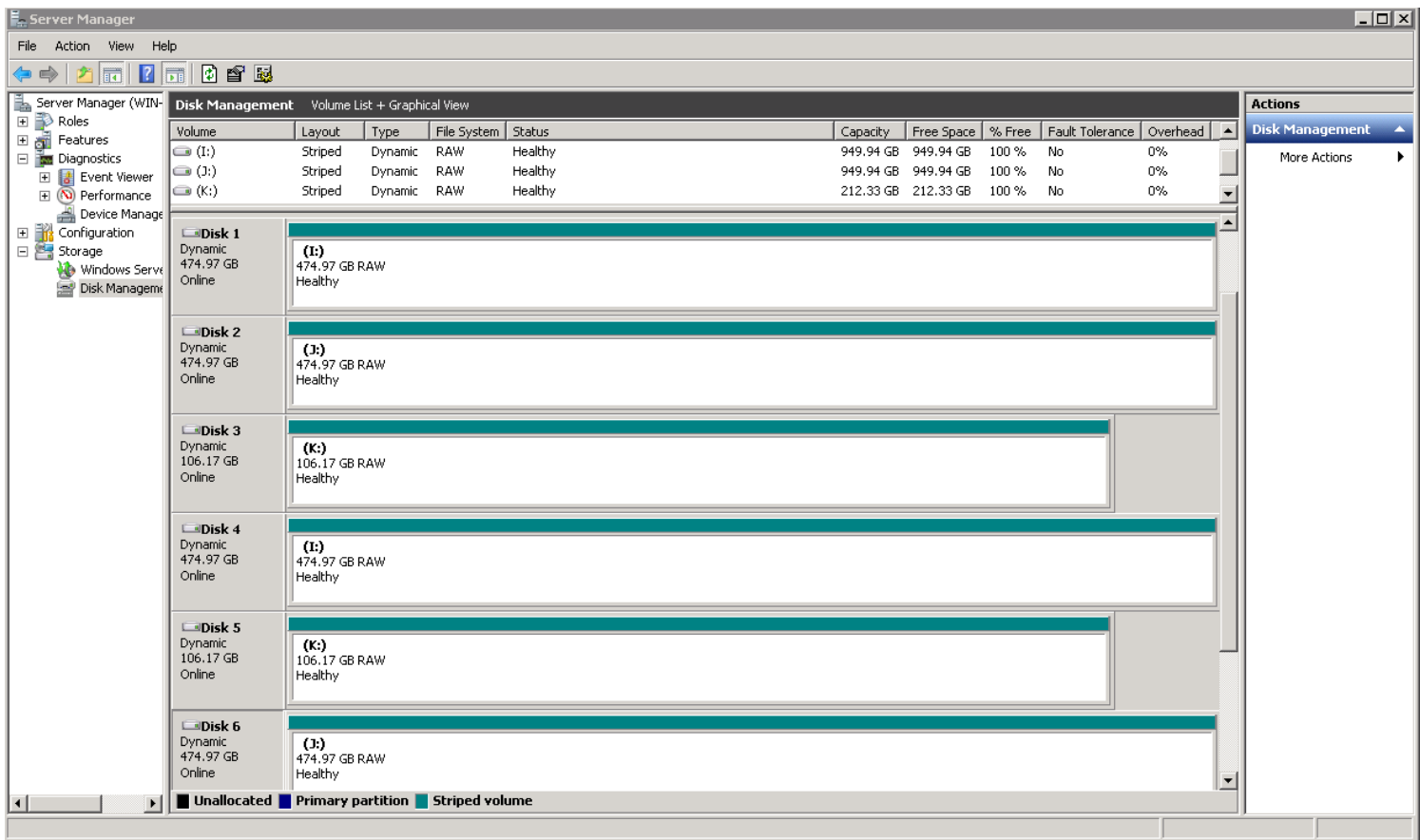
9. Disk Management confirmation, click **Yes**



10. Microsoft Windows asking to format disk, click **Cancel**



11. Repeat steps 2 – 10 for drives **J:** and **K:**
12. After all three logical volumes have been created, Disk Management will look as this:



APPENDIX E: CONFIGURATION INVENTORY

The Test Storage Configuration was collected before and after the test phases. The CLI commands were used.

```
# show system
# show controllers
# show versions detail
```

```
# show ports

# show disks encl

# show volumes detail

# show disk-groups
```

The outputs of the commands were in the log files:

/DS4200_BEFORE_log_0712 Before the test

/DS4200_AFTER_log_0712 After the test

APPENDIX F: WORKLOAD GENERATOR

The ASU Definition file is included in the Supporting Files.

SPC1.asu

```
OFFSET=0
SIZE=0
ASU=1
DEVICE=\\.\i:
ASU=2
DEVICE=\\.\j:
ASU=3
DEVICE=\\.\k:
```

The full-run of the test used the script ***basic_full_run_4200_0712.bat*** and manually invoke the PERSIST_2 after the TSC was restarted.

basic_full_run_4200_0712.bat

```
set IOPS=100000
set INIT_IOPS=600
set PERSIST_IOPS=25000
set OUTPUT=full_run_output_S4200_0712
set STORAGE=SPC1.asu
set SPC1=spc1_v3.0.2

%SPC1% -run SPC1_INIT      -output %OUTPUT% -iops %INIT_IOPS% -storage %STORAGE%
%SPC1% -run SPC1_VERIFY   -output %OUTPUT% -iops 100      -storage %STORAGE%
%SPC1% -run SPC1_METRICS  -output %OUTPUT% -iops %IOPS%   -storage %STORAGE%
%SPC1% -run SPC1_VERIFY   -output %OUTPUT% -iops 100      -storage %STORAGE%
%SPC1% -run SPC1_PERSIST_1 -output %OUTPUT% -iops %PERSIST_IOPS% -storage %STORAGE%
echo "Now Restart the TSC and run:"
echo "4200run > .\SPC1_v3.0.2 -run SPC1_PERSIST_2 -output full_run_output_S4200_0712
-iops 25000 -storage SPC1.asu"
```

Manually invoke PERSIST_2:

```
.\SPC1_v3.0.2 -run SPC1_PERSIST_2 -output full_run_output_S4200_0712 -iops 25000 -
storage SPC1.asu
```