



# Avid® ISIS® 5500 | 5000 v4.6

## Performance and Redistribution Guide

### Change History

Date Revised	Release	Changes Made
12/1/2013	4.6	<ul style="list-style-type: none"><li>• Add new OS and editor version support</li><li>• Make table headings repeat across pages</li></ul>
9/30/2013	4.5	<ul style="list-style-type: none"><li>• First Draft</li><li>• Add/Remove redistribution with load</li><li>• New client support (Win 8 and RedHat)</li><li>• 5500 64 TB engine</li><li>• New resolution support (XAVC and 2K with DS 11.x)</li><li>• Updated FCP and Adobe Premier supported streams</li></ul>
12/10/2012	4.2	<ul style="list-style-type: none"><li>• Added What's new for 4.2/4.0.3</li><li>• Updated to include ISIS 2000-120 TB</li><li>• Updated Editor version support</li><li>• Added new CS6 results</li><li>• Updated ICPS/ICS section</li><li>• General revision updates</li></ul>
9/10/2012	v4.1	<ul style="list-style-type: none"><li>• Added ISIS 2000</li><li>• Added new platforms tested</li><li>• Added DNxHD 100 and J2k stream counts</li></ul>
6/6/2012	v4.0	<ul style="list-style-type: none"><li>• Added Airspeed 5000 to sections 5.3 and 5.4</li><li>• Updated the stream counts for Interplay Central in section 7</li></ul>

This document provides performance guidance for the Avid ISIS 5500 | 5000 version 4.5. Charts detailing the bandwidth required for supported resolutions in multiple formats are provided. Expected performance and duration of drive rebuild conditions and redistributions have been outlined. This release supports Symphony/Media Composer v7.0.x, 6.5.x, 6.x and 5.5.x.

## Contents

1.0	What's new for ISIS 5000 v4.6 .....	3
2.0	What's new for ISIS 5000 v4.5 .....	3
3.0	Revisions from ISIS v4.0.3 / 2000 v4.2.....	3
4.0	Revisions from ISIS v4.01/4.1 and Prior to This Guide .....	4
5.0	Revisions from ISIS v4.0 and 3.5 of This Guide .....	4
6.0	ISIS 5000 10 Gb Clients.....	4
7.0	Engine Performance .....	6
7.1	Examples of How to Apply the Previous Engine Ratings.....	6
7.2	Performance Guidance During Drive Rebuilds.....	8
7.3	Examples of How to Apply Engine Ratings During a Single Drive Rebuild .....	8
8.0	Supported Stream Counts .....	9
8.1	Performance Considerations for Digital Cut .....	9
8.2	Supported Stream Counts with Avid Editors .....	10
8.3	Supported Stream Counts with Avid Non-Editor Ingest Devices .....	23
8.4	Supported Stream Counts with Avid Non-Editor Playback Devices.....	24
9.0	Pro Tools Performance .....	27
10.0	Interplay Central Performance.....	27
11.0	Adding a Single or Multiple Engines to a Storage Group .....	28
12.0	Removing an Engine from a Storage Group.....	29
13.0	Editor Hardware and Software Used During Testing .....	29
14.0	Supported Stream Counts with Apple Final Cut Pro Editors .....	32
14.1	Engine Bandwidth Performance (MB/s) with Final Cut Pro Clients .....	32
14.2	Final Cut Pro Editor Hardware and Software Used During Testing .....	37
15.0	Engine Bandwidth Performance (MB/s) with Adobe Premiere Clients .....	37
15.1	Adobe Premiere Hardware and Software Used During Testing .....	44

## 1.0 What's new for ISIS 5000 v4.6

- Avid has added support for Windows v8.1 and Mac OSX v10.9.

## 2.0 What's new for ISIS 5000 v4.5

- The Avid ISIS 7000, Avid ISIS 5500 | 5000 and Avid ISIS 2000 infrastructures now support clients with the Windows 8 64-bit operating system.

Note: Version 4.5 will be the last ISIS Client Manager release tested on workstations and laptops with the Microsoft Windows XP and Windows Vista Operating Systems. It is recommended that you update your client Operating Systems to Windows 7 or Windows 8 if you plan to upgrade to future versions of ISIS software.

- The Avid ISIS 7000, Avid ISIS 5500 | 5000 and Avid ISIS 2000 infrastructures now support Red Hat® Enterprise Linux® v6.2 and 6.3 clients. 1 Gb and 10 Gb connections are supported. At this time 2 X 1 Gb offers redundancy with no performance benefit.
- ISIS 5500 with v4.5 now allows clients to read and write during an “Add,” “Full,” and “Remove” redistributions of ISIS 5500 Engines to Storage Groups.
- Move workspaces between storage groups on ISIS 5500 and 5000. ISIS 5500 and 5000 v4.5 now has the capability to move workspaces between storage groups. Workspaces can be moved while clients are accessing the system. Please see the Avid ISIS Administration Guide for more information.
- Support for more files on ISIS 5500 and 5000: ISIS 5500 and ISIS 5000 now support up to 8 Million Files. Prior to version 4.5, ISIS 5000 had a limitation of 3 Million files.
- 64TB ISIS 5500 Engine: Version 4.5 introduces a new 64TB engine capacity to the ISIS 5500 family.
- Mixing media from two ISIS 7000 and/or 5500 infrastructures up to DNxHD 220 resolutions.
- Mac OSX finder level copy performance and directory navigation improvements: ISIS v4.5 dramatically increases the performance of copying files to and from ISIS workspaces and allows you to browse directories with high file counts quickly. Directory browsing performance improvements will only be realized on newly copied material- any material that was written to ISIS workspaces prior to v4.5 may exhibit degraded performance until the files are copied to a new ISIS location. Note that moving workspaces from one storage group to another will not improve performance for browsing existing directories- the directories and files themselves need to be copied to another location.

## 3.0 Revisions from ISIS v4.0.3 / 2000 v4.2

The ISIS v4.2 software kit includes ISIS 7000 v4.0.3, ISIS 5000 v4.0.3, and ISIS 2000 v4.2. The Avid ISIS v4.2 Client Manager software is required for ISIS 7000 v4.0.3, ISIS 5000 v4.0.3, and ISIS 2000 v4.2 infrastructures. For a list of what's new in ISIS v4.2, see the ReadMe. This document includes performance related details on the ISIS 2000-120 (half populated) configuration introduced in the v4.2 release. This release of ISIS also introduces support for Apple Mountain Lion v10.8, Symphony/Media Composer 6.5, as well as Adobe CS6. There have also been updates to the ICPS/ICS and Adobe Premier sections of this document.

## 4.0 Revisions from ISIS v4.01/4.1 and Prior to This Guide

The ISIS v4.1 software kit includes ISIS 7000 v4.0.1, ISIS 5000 v4.0.1, and ISIS 2000 v4.1. The Avid ISIS v4.1 Client Manager software is required for ISIS 7000 v4.0.1, ISIS 5000 v4.0.1, and ISIS 2000 v4.1 infrastructures. For a list of what's new in ISIS v4.1, see the ReadMe.

This document includes performance related details on the ISIS 2000 (nearline) v4.1 release. Some minor changes to the ISIS 7000 and ISIS 5000 v4.0 stream counts have changed for v4.0.1; DNxHD 100 and J2k resolutions have also been added.

## 5.0 Revisions from ISIS v4.0 and 3.5 of This Guide

Avid ISIS v4.0 Client Manager software is supported in the ISIS 7000 v2.4, ISIS 7000 v4.0, ISIS 5000 v3.2, and ISIS 5000 v4.0 infrastructures. Avid ISIS 7000 v4.0 and ISIS 5000 v4.0 infrastructure software requires Avid ISIS v4.0 Client Manager software. For a complete list of new features see the *ISIS v4.0 ReadMe*.

The following is a list of new performance related features that were added in the *Avid ISIS v4.0 release*:

- Added support for 10 Gb clients on Avid ISIS 5000.



10 Gb clients require the v4.0 infrastructure.

- Avid has qualified the Myricom v1.1.9 Windows driver and the “myri10ge-macosx-1.3.0avid-1500” Macintosh driver. All existing Avid ISIS 10 Gb clients are required to upgrade the driver, see *Avid ISIS Client Guide* for driver installation and upgrade instructions.
- Avid has completed its characterization of Adobe Premiere Pro version CS5.5 64-bit clients in an Avid ISIS v4.0 shared storage environment.
- Higher stream counts are now supported for DNxHD resolutions depending on your connection type.

The following list summarizes ISIS v3.5 features:

- Added support for Macintosh Lion (10.7.x) clients, both 32 bit kernel using Symphony/Media Composer v5.5.3 and 64 bit kernel using Symphony/Media Composer v6.x.
- Client support in Zone 3
- Support for Avid Pro Tools 10
- Avid has qualified dual client connections with two ISIS infrastructures. The following summarizes the support:
  - Single client connections to two ISIS 5000 infrastructures
  - Single client connections to two ISIS 7000 infrastructures
  - Single client connections to an ISIS 5000 and an ISIS 7000 infrastructure

## 6.0 ISIS 5000 10 Gb Clients

Avid ISIS v4.0 added support for Windows and Macintosh ultra-high resolution clients (UHRC). The Myricom 10-Gb Ethernet adapter has been qualified on Windows XP, Windows Vista, Windows 7, Windows 2008, Macintosh Snow Leopard (10.6.8), Macintosh Lion (up to v10.7.3) and Macintosh Mountain Lion (10.8.4) operating systems for Avid editing clients. ISIS v4.0 also introduced 10 Gb client

support for Red Hat® Enterprise Linux®v6.2 and 6.3. These 10-Gb clients connect into a 10-Gb port on a qualified switch or can connect directly into the ISIS 5000 System Director 10-Gb port on a switch-less configuration. Chelsio 10-Gb Ethernet adapters are not supported with ISIS 5000 clients.

You can have one 10 Gb client per ISIS 5000 engine. For example, in a six Engine configuration you can have six 10 Gb clients. For instructions on installing the Myricom board and software, see the *Avid ISIS Client Guide*.



10 Gb clients require the v4.0 infrastructure.

## 7.0 Engine Performance

The ISIS 5000 scales in a linear fashion (up to 6 engines) and is based on the amount of bandwidth an ISIS 5000 engine can provide.

The following table defines an engine's capabilities. A mix of Avid editors and test tools were used to generate bandwidth on the system during testing. Engine bandwidth ratings have been broken out into three different categories.

- An all Read workflow
- An all Write workflow
- An Aggregate workflow (a mix of readers and writers)

### Engine Bandwidth Ratings By Categories

	All Reads	All Writes	Aggregate
Available B/W per engine	350 MB/s	200 MB/s	300 MB/s

### 7.1 Examples of How to Apply the Previous Engine Ratings

#### Example 1:

#### A single ISIS 5000 engine with a mix of capture and playback clients

# of Clients	Client Type	Format/ Resolution	# of Streams per Client	Data Rate per Stream	Bandwidth
1	Dual 1 Gb or 10 Gb	720p/29.97 10-bit HD	2 (reader)	71MB/s	142MB/s
1	Dual 1 Gb or 10 Gb	720p/23.976 8-bit HD	2 (reader)	58MB/s	116MB/s
1	1 Gb	1080i 59.94 DNxHD 220	1 (writer)	28MB/s	28MB/s
2	1 Gb	1080p/29.97 DNxHD 145	2 (writer)	18.5MB/s	37MB/s
Total Bandwidth Required = 323 MB/s					
Total Available Bandwidth = 300 MB/s					

**Failed:** In this example the total throughput required would not fall in line with the approved aggregate rating of 300 MB/s for a single ISIS 5000 engine. To remedy this problem the DNxHD220 writer could be stopped freeing up 28 MB/s of bandwidth. This would bring the total bandwidth consumed down to 295 MB/s which would fall safely into the engine rating.

**Example 2:  
Two ISIS 5000 engines with a mix of capture and playback devices**

# of Clients	Client Type	Format/ Resolution	# of Streams per Client	Data Rate per Stream	Bandwidth
5	1 Gb	1080i 59.94 XDCAM 50	2 (reader)	8 MB/s	80 MB/s
4	1 Gb	1080i 59.94 DNxHD 220x	1 (writer)	28 MB/s	112 MB/s
2	Dual 1 Gb or 10 Gb	720p / 25 8-bit HD	3 (reader)	48 MB/s	288 MB/s
5	1 Gb	30i DV 50	3 (reader)	8 MB/s	120 MB/s
Total Bandwidth Required = 600 MB/s					
Total Available Bandwidth = 600 MB/s					

**Passed:** The total throughput required would fall in line with the approved aggregate engine rating of 600 MB/s used when mixing capture and playback devices on two ISIS 5000 engines.

**Example 3:  
Two ISIS 5000 engines with a mix of capture and playback devices**

# of Clients	Client Type	Format/ Resolution	# of Streams per Client	Data Rate per Stream	Bandwidth
5	1 Gb	1080i 59.94 XDCAM 50	2 (reader)	8 MB/s	80 MB/s
4	1 Gb	1080i 59.94 DNxHD 220x	1 (writer)	28 MB/s	112 MB/s
2	Dual 1 Gb or 10 Gb	720p/25 8-bit HD	3 (reader)	48 MB/s	288 MB/s
5	1 Gb	30i DV 50	3 (reader)	8 MB/s	120 MB/s
1	Dual 1 Gb or 10 Gb	1080i 59.94 8-bit HD	1 (writer)	125 MB/s	125 MB/s
Total Bandwidth Required = 725 MB/s					
Total Available Bandwidth = 600 MB/s					

**Failed:** The total throughput required would not fall in line with the approved aggregate engine rating of 600 MB/s used when mixing ingest and playback devices on two ISIS 5000 engines. To remedy this problem remove the 8-bit HD write indicated in the shaded row.

## 7.2 Performance Guidance During Drive Rebuilds

In the event a drive needs to be replaced and a rebuild initialized, follow the guidance below for expectations on time to completion and bandwidth available. Keep in mind that the less bandwidth used the faster the rebuild will take place.

- If your storage group spans two engines the de-rating factor will be applied to both.
- Initially in first 5 minutes of the rebuild process you may experience skipped frames on playback.
- During a rebuild individual client bandwidth should be limited to 1 Gb rates until the rebuild has finished. UHRC resolutions are not supported during drive rebuilds.
- Exceeding the bandwidth ratings provided will result in skipped frames and possibly video overruns.

### Drive Rebuild Times per Bandwidth and Number of Engines

Engine	Bandwidth None	Bandwidth 100 MB/s per Engine	Bandwidth 200 MB/s per Engine
4 TB drives	25 hrs.	50 hrs.	100 hrs.
2 TB drives	14 hrs	35 hrs	70 hrs
1 TB drives	7 hrs	17.5 hrs	35 hrs

## 7.3 Examples of How to Apply Engine Ratings During a Single Drive Rebuild

### Example 4:

The chart below is an example of a single ISIS 5000 engine during a single drive rebuild. The bandwidth rating utilized will be 200 MB/s.

# of Clients	Client Type	Format/ Resolution	# of Streams per Client	Data Rate per Stream	Bandwidth
1	1 Gb	1080i 59.94 XDCAM 50	2 (reader)	8 MB/s	16 MB/s
2	1 Gb	1080i 59.94 DNxHD220x	1 (writer)	28 MB/s	56 MB/s
2	1 Gb	720p25 / 8-bit HD	1 (reader)	48 MB/s	48 MB/s
2	1 Gb	30i /-DV 50	3 (reader)	8 MB/s	48 MB/s
1	1 Gb	30i / DV 25 4-way	5 (reader)	4 MB/s	20 MB/s
Total Bandwidth Required = 188 MB/s Total Available Bandwidth = 200 MB/s Approximate time to completion = 70 hours					

**Passed:** The total throughput required would fall in line with the approved engine rating of 200 MB/s during the rebuild process for single ISIS 5000 engine.

### Example 5:

The chart below is an example of two ISIS 5000 engines during a single drive rebuild. The bandwidth rating utilized will be 200 MB/s per engine.

# of Clients	Client Type	Format/ Resolution	# of Streams per Client	Data Rate per Stream	Bandwidth
1	Dual Gb (2 Gb)	1080i 59.94 DNxHD 145 4-way	5 (reader)	18.5 MB/s	92.5 MB/s
2	1 Gb	30i / DV 50	3 (reader)	8 MB/s	48 MB/s
1	1 Gb	30i / DV 25 4-way	5 (reader)	4 MB/s	20 MB/s
1	1 Gb	1080p 25 / DNxHD 36	3 (reader)	5 MB/s	15 MB/s
1	1 Gb	30i / 2:1	4 (reader)	8 MB/s	32 MB/s
2	1 Gb	1080p / DNxHD 220	2 (writer)	28 MB/s	112 MB/s
1	Dual Gb (2 Gb)	720p 50 / 8-bit HD	1 (writer)	89MB/s	89 MB/s
Total Bandwidth Required = 408.5 MB/s Total Available Bandwidth = 400 MB/s Approximate time to completion = 70 hours					

**Failed:** The total throughput required would not fall in line with the approved engine rating of 200 MB/s during the rebuild process for two single ISIS 5000 engines. There are two reasons for the failure:

- (1) The bandwidth has exceeded the approved rating of 400 MB/s.
- (2) Dual Gigabit (2 Gb) clients (as see in the shaded cells) were utilized during the rebuild process. 2 Gb clients are currently not supported during this operation

## 8.0 Supported Stream Counts

### 8.1 Performance Considerations for Digital Cut

When an ISIS 5000 System is under heavy load, there is always the possibility that one of the disks in the environment could encounter a long command time. These can be caused by a number of factors including high read and write traffic and, in some situations, failing disks. When a long command time is encountered, the client system playing the file could skip one or more frames during playback. When in Digital Cut mode, an Avid Editing system will automatically stop if a skipped frame is encountered. High bandwidth streams are more susceptible to this condition.

If you experience this condition, it is recommended that you reduce the load on your system until your Digital Cut or other critical playback operation is complete. Limiting write operations (capture, render, transcode, consolidate) has a greater effect on reducing overall load on the system than limiting read operation. If the condition continues, it is recommended that you contact Avid Customer Success to evaluate the health of the drives in your configuration.

## 8.2 Supported Stream Counts with Avid Editors

The charts in this section define the bandwidth used per resolution and a recommended stream count. Take the following into consideration when reading the tables below. All bandwidth ratings have been adjusted to include up to 8 tracks of 16 bit audio @ 48 KHz. The sequence used for testing has two second audio and video cuts offset by one second. Stream counts vary depending on the platform and editor version. You might be able to achieve higher stream counts on the newer platforms.

See the *Avid ISIS ReadMe* for supported application revisions.

Avid supports one 10 Gb UHRC client per ISIS 5000 chassis.

Clients with 2 X 1 Gb connections that are doing uncompressed HD resolutions (i.e., UHRC) must set the ISIS Client type to Ultra High Resolution.

10 Gb clients require the v4.0 infrastructure.

Media Composer 6.0 introduces support for 3D stereoscopic mode. Resolutions that support full frame 3D stereoscopic on ISIS 5000 are shaded yellow. 3D stereoscopic full frame capture of 1:1 10 bit or 1:1 8 bit material requires a 10 Gb connection.

For support of 3D stereoscopic and multi-stream RGB support you must have at least 12 GB of memory installed.

ProRes resolutions (indicated by italics) are available with the optional dual DNxHD or AVCI codec cards in Nitris DX the DNxHD or AVCI resolutions are available for full frame 3D stereoscopic.

For some platforms, achieving the highest stream count may require switching the video quality mode during playback operations. (example Draft or Full Quality)

All streams counts are based on a single engine. With an additional engine, some stream counts have the potential to be higher.

When playing back compressed resolutions workstations with additional processors will allow you to achieve higher stream counts. This especially applies to Avid supported laptops. For all laptops please use the 1 Gb guidance provided. (See the latest editing software Readme for a list of restrictions meant for your individual workstation or laptop.)

When an individual editor requires bandwidth of 60 MB/s or more, Avid suggests the use of a 2 Gb client connection. This will prevent video overruns when capturing and skipped frames on playback. When a client is dual connected in Zone 3 both interfaces must be in the same subnet.

## DV

Resolution	Project Format	Number of Streams per client (MB/s)						Multi-cam (MB/s)		GB/Hour
		1	2	3	4	5	6	4-way	9-way	
DV 25	30i NTSC PAL	4	8	12	16	20	24	20	40	14
DV 50	30i NTSC PAL	8	16	24	32	40	48	40	80	28

### Legend

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange shaded cells indicate 10 Gb connectivity required.
- Yellow shaded cells indicate resolutions available for 3D stereoscopic
- N/S indicates not supported

## MPEG

Resolution	Project Format	Number of Streams per client (MB/s)						Multi-cam (MB/s)		GB/Hour
		1	2	3	4	5	6	4-way	9-way	
MPEG 30	30i NTSC 25i PAL	4	8	12	16	20	24	20	40	14
MPEG 40	30i NTSC 25i PAL	5	10	15	20	25	30	25	50	18
MPEG 50	30i NTSC 25i PAL	8	16	24	32	40	48	40	80	28

### Legend

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange shaded cells indicate 10 Gb connectivity required.
- Yellow shaded cells indicate resolutions available for 3D stereoscopic
- N/S indicates not supported

## JFIF Progressive

Resolution	Project Format	Number of Streams per client (MB/s)						Multi-cam (MB/s)		GB/Hour
		1	2	3	4	5	6	4-way	9-way	
35:1	24p 23.976p NTSC	1.5	3	4.5	6	7.5	9	7.5	15	5
	25p, 24p PAL	1.5	3	4.5	6	7.5	9	7.5	15	5
28:1	24p, 23.976p NTSC	1.5	3	4.5	6	7.5	9	7.5	15	5
	25p, 24p PAL	1.5	3	4.5	6	7.5	9	7.5	15	5
14:1	24p, 23.976p NTSC	2.5	5	7.5	10	12.5	15	12.5	25	9
	25p, 24p PAL	2.5	5	7.5	10	12.5	15	12.5	25	9
3:1	24p, 23.976p NTSC	6	12	18	24	30	36	30	60	21
	25p, 24p PAL	7	14	21	28	35	42	35	70	25
2:1	24p, 23.976p NTSC	8	16	24	32	40	48	40	80	28
	25p, 24p PAL	9.5	19	28.5	38	47.5	57	47.5	95	33
1:1 SD	24p, 23.976p NTSC	17.5	35	52.5	70	87.5	105	87.5	N/S	62
	25p, 24p PAL	22	44	N/S	N/S	N/S	N/S	110	N/S	77
1:1 10b SD	24p, 23.976p NTSC	22	44	N/S	N/S	N/S	N/S	110	N/S	77
	25p, 24p PAL	25	50	75	100	125	150	125	N/S	88

## JFIF Interlaced

Resolution	Project Format	Number of Streams per client (MB/s)						Multi-cam (MB/s)		GB/Hour
		1	2	3	4	5	6	4-way	9-way	
15:1s	30i NTSC, 25i PAL	1.5	3	4.5	6	7.5	9.0	7.5	15	5
4:1s	30i NTSC, 25i PAL	2.5	5	7.5	10	12.5	15	12.5	25	9
2:1s	30i NTSC, 25i PAL	4	8	12	16	20	24	20	40	14
20:1	30i NTSC, 25i PAL	2	4	6	8	10	12	10	20	7
10:1	30i NTSC, 25i PAL	3	6	9	12	15	18	15	30	11
3:1	30i NTSC, 25i PAL	7	14	21	28	35	42	35	70	25
2:1	30i NTSC, 25i PAL	9.5	19	28.5	38	47.5	57	47.5	95	33
1:1 SD	30i NTSC, 25i PAL	22	44	66	88	110	132	110	N/S	77
1:1 10b SD	30i NTSC, 25i PAL	28.5	57	85.5	114	142.5	171	142.5	N/S	100

### Legend

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange shaded cells indicate 10 Gb connectivity required.
- Yellow shaded cells indicate resolutions available for 3D stereoscopic
- N/S indicates not supported

### 2K\*

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/ Hour
		1	2	3	4	5	6	7	8	4-way	9-way	
2K GEN*	2K/24 2048 X 1556	286	N/S	N/S	962							

\*Avid DS 11.x only

1080i

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/ Hour
		1	2	3	4	5	6	7	8	4-way	9-way	
RGB 10-bit *	1080i/ 59.94	240	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	864
1:1 10-bit HD		150	300	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	527
1:1 HD		125	250	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	439
RGB ProRes 4444		42	84	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	148
DNxHD 220 X		28	56	84	112	140	168	196	224	140	N/S	98
ProRes HQ		28	56	84	112	140	N/S	N/S	N/S	N/S	N/S	98
DNxHD 220		28	56	84	112	140	168	196	224	140	N/S	98
DNxHD 145		18.5	37	55.5	74	92.5	111	129.5	148	92.5	185	65
ProRes		18.5	37	55.5	74	N/S	N/S	N/S	N/S	N/S	N/S	65
DNxHD 100		14	28	42	56	70	84	N/S	N/S	70	N/S	46
J2k**		19*	38*	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	66
ProRes LT		13	26	39	52	N/S	N/S	N/S	N/S	N/S	N/S	46
XDCAM 50		8	16	24*	32*	N/S	N/S	N/S	N/S	40	N/S	28
XDCAM 35		5	10	15	N/S	N/S	N/S	N/S	N/S	25	N/S	18
XDCAM 25		3.5	7	10.5	N/S	N/S	N/S	N/S	N/S	17.5	N/S	13
XDCAM 17.5		2.5	5	7.5	N/S	N/S	N/S	N/S	N/S	12.5	N/S	9
DVCPRO HD		14.5	29	43.5	58	72.5	N/S	N/S	N/S	58	145	51
AVC-Intra 50		8	16	24*	32*	N/S	N/S	N/S	N/S	44	N/S	28
AVC-Intra 100		14	28	42*	56*	N/S	N/S	N/S	N/S	70*	N/S	50
XAVC 100		14	28	42*	56*	N/S	N/S	N/S	N/S	N/S	N/S	50
VC1-APL3	6	12	18	24	N/S	N/S	N/S	N/S	N/S	N/S	21	
ProRes Proxy	5	10	15	20	25	N/S	N/S	N/S	N/S	N/S	18	
H264 Proxy	1	2	3	4	5	N/S	N/S	N/S	N/S	N/S	3.5	

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/ Hour
		1	2	3	4	5	6	7	8	4-way	9-way	
RGB 10-bit *	1080i 50	206	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	742
1:1 10-bit HD		131	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	461
1:1 HD		105	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	369
RGB ProRes 4444		36	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	127
DNxHD 185 X		23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/S	83
DNxHD 185		23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/S	83
ProRes HQ		23.5	47	70.5	94	N/S	N/S	N/S	N/S	N/S	N/S	83
DNxHD 120		16	32	48	64	80	96	112	128	80	N/S	56
ProRes		16	32	48	64	N/S	N/S	N/S	N/S	N/S	N/S	56
J2k**		16*	32*	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	56
ProRes LT		11	22	33	44	55	N/S	N/S	N/S	N/S	N/S	39
DVCPRO HD		14.5	29	43.5	58	72.5	N/S	N/S	N/S	58	145	51
XDCAM 50		8	16	24*	32*	N/S	N/S	N/S	N/S	40	N/S	28
XDCAM 35		5	10	15	N/S	N/S	N/S	N/S	N/S	25	N/S	18
XDCAM 25		3.5	7	10.5	N/S	N/S	N/S	N/S	N/S	17.5	N/S	13
XDCAM 17.5		2.5	5	7.5	N/S	N/S	N/S	N/S	N/S	12.5	N/S	9
AVC-Intra 50		8	16	24*	32*	N/S	N/S	N/S	N/S	44	N/S	28
AVC-Intra 100		14	28	42*	56*	N/S	N/S	N/S	N/S	70*	N/S	50
XAVC 100		14	28	42*	56*	N/S	N/S	N/S	N/S	N/S	N/S	50
VC1-APL3		6	12	18	24	N/S	N/S	N/S	N/S	N/S	N/S	21
ProRes Proxy	4	8	12	16	N/S	N/S	N/S	N/S	N/S	N/S	14	
H264 Proxy	1	2	3	4	5	N/S	N/S	N/S	N/S	N/S	3.5	

(\*) Minimum Platform/Memory requirements must be met. Please refer to the Symphony/Media Composer ReadMe associated to the version of software you are using for detailed platform support.

(\*\*) Estimated average as compression is variable rate.

**Legend**

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange shaded cells indicate 10 Gb connectivity required.
- Yellow shaded cells indicate resolutions available for 3D stereoscopic
- N/S indicates not supported

**1080p**

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/ Hour
		1	2	3	4	5	6	7	8	4-way	9-way	
RGB 10-bit *	1080p/ 29.97	240	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	864
1:1 10-bit HD		150	300	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	527
1:1 HD		125	250	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	439
RGB DNxHD 444 440 X		55	110	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	194
RGB ProRes 4444		42	84	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	148
DNxHD 220 X		28	56	84	112	140	168	196	224	140	N/S	98
DNxHD 220		28	56	84	112	140	168	196	224	140	N/S	98
ProRes HQ		28	56	84	112	N/S	N/S	N/S	N/S	N/S	N/S	98
DNxHD 145		18.5	37	55.5	74	92.5	111	129.5	148	92.5	N/S	65
ProRes		18.5	37	55.5	74	N/S	N/S	N/S	N/S	N/S	N/S	65
DNxHD 100		14	28	42	56	70	84	N/S	N/S	70	N/S	46
J2k**		19*	38*	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	67
ProRes LT		13	26	39	52	N/S	N/S	N/S	N/S	N/S	N/S	46
XDCAM50		8	16	24*	32*	N/S	N/S	N/S	N/S	40	N/S	28
XDCAM35		5	10	15	N/S	N/S	N/S	N/S	N/S	25	N/S	18
XDCAM25		3.5	7	10.5	N/S	N/S	N/S	N/S	N/S	17.5	N/S	13
DNxHD 45		6	12	18	24	30	N/S	N/S	N/S	30	60	21
ProRes Proxy	5	10	15	20	25	30	N/S	N/S	N/S	N/S	18	
RGB 10-bit *	1080p/25	206	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	742

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/ Hour
		1	2	3	4	5	6	7	8	4-way	9-way	
1:1 10-bit HD		131	262	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	461
1:1 HD		105	210	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	373
RGB DNxHD 444 365 X		46	92	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	162
RGB ProRes 4444		36	72	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	127
DNxHD 185 X		23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/S	83
DNxHD 185		23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/S	83
ProRes HQ		23.5	47	70.5	94	N/S	N/S	N/S	N/S	N/S	N/S	83
DNxHD 120		16	32	48	64	80	96	112	128	80	N/S	56
ProRes		16	32	48	64	N/S	N/S	N/S	N/S	N/S	N/S	56
J2k**		16*	32*	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	56
ProRes LT		11	22	33	44	55	N/S	N/S	N/S	N/S	N/S	39
XDCAM50		8	16	N/S	N/S	N/S	N/S	N/S	N/S	40	N/S	28
XDCAM35		5	10	N/S	N/S	N/S	N/S	N/S	N/S	25	N/S	18
XDCAM25		3.5	7	N/S	N/S	N/S	N/S	N/S	N/S	17.5	N/S	13
DNxHD 36		5	10	15	20	25	30	35	40	25	50	18
VC1-APL3		1	2	3	N/S	N/S	N/S	N/S	N/S	N/S	N/S	4
ProRes Proxy		4	8	12	16	20	24	N/S	N/S	N/S	N/S	14
RGB 10-bit *		1080p/24	196	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
1:1 10-bit HD	126		252	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	443
1:1 HD	101		202	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	355
RGB DNxHD 444 350 X	44		88	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	155
RGB ProRes 4444	35		70	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	123
DNxHD 175 X	23		46	69	92	115	138	161	184	115	N/S	81

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/ Hour
		1	2	3	4	5	6	7	8	4-way	9-way	
DNxHD 175		23	46	69	92	115	138	161	184	115	N/S	81
ProRes HQ		23	46	69	92	N/S	N/S	N/S	N/S	N/S	N/S	81
DNxHD 115		15.5	31	46.5	62	77.5	93	108.5	124	77.5	N/S	54
ProRes		15.5	31	46.5	62	N/S	N/S	N/S	N/S	N/S	N/S	54
J2k**		15*	30*	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	53
ProRes LT		10	20	30	40	50	N/S	N/S	N/S	N/S	N/S	35
XDCAM35		5	10	N/S	N/S	N/S	N/S	N/S	N/S	25	N/S	18
XDCAM25		3.5	7	N/S	N/S	N/S	N/S	N/S	N/S	17.5	N/S	13
XDCAM17.5		2.5	5	N/S	N/S	N/S	N/S	N/S	N/S	12.5	N/S	9
DNxHD 36		5	10	15	20	25	30	35	40	25	50	18
VC1-APL3		6	12	18	N/S	N/S	N/S	N/S	N/S	N/S	N/S	21
ProRes Proxy		4	8	12	16	20	N/S	N/S	N/S	N/S	N/S	14
RGB 10-bit *	1080p/ 23.976	196	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	706
1:1 10-bit HD		126	252	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	527
1:1 HD		101	202	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	355
RGB DNxHD 444 350 X		44	88	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	155
RGB ProRes 4444		35	70	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	123
DNxHD 175 X		23	46	69	92	115	138	161	184	115	N/S	81
DNxHD 175		23	46	69	92	115	138	161	184	115	N/S	81
ProRes HQ		23	46	69	92	N/S	N/S	N/S	N/S	N/S	N/S	81
DNxHD 115		15.5	31	46.5	62	77.5	93	108.5	124	77.5	155	54
ProRes		15.5	31	46.5	62	N/S	N/S	N/S	N/S	N/S	N/S	54
J2k**		15*	30*	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	53
ProRes LT		9	18	27	36	N/S	N/S	N/S	N/S	N/S	N/S	32

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/ Hour
		1	2	3	4	5	6	7	8	4-way	9-way	
XDCAM35		5	10	N/S	N/S	N/S	N/S	N/S	N/S	25	N/S	18
XDCAM25		3.5	7	N/S	N/S	N/S	N/S	N/S	N/S	17.5	N/S	13
XDCAM17.5		2.5	5	N/S	N/S	N/S	N/S	N/S	N/S	12.5	N/S	9
DNxHD 36		5	10	15	20	25	30	35	40	25	50	18
AVC-Intra 50		8	16	N/S	N/S	28						
AVC-Intra 100		14	28	N/S	N/S	50						
VC1-APL3		6	12	18	N/S	N/S	N/S	N/S	N/S	N/S	N/S	21
ProRes Proxy		4	8	12	16	20	N/S	N/S	N/S	N/S	N/S	14

(\*) Minimum Platform/Memory requirements must be met. Please refer to the Symphony/Media Composer ReadMe associated to the version of software you are using for detailed platform support.

(\*\*) Estimated average as compression is variable rate.

**Legend**

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange shaded cells indicate 10 Gb connectivity required.
- Yellow shaded cells indicate resolutions available for 3D stereoscopic
- N/S indicates not supported

## 720p

Resolution	Project Format	Number of Streams per client (MB/s)						Multi-cam (MB/s)		GB/Hour
		1	2	3	4	5	6	4-way	9-way	
1:1 10-bit HD	720p/59.94	142	284	N/S	N/S	N/S	N/S	N/S	N/S	499
1:1 HD		106	210	N/S	N/S	N/S	N/S	N/S	N/S	373
DNxHD 220 X		28	56	84	112	140	N/S	140	N/S	98
DNxHD 220		28	56	84	112	140	N/S	140	N/S	98
ProRes HQ		28	56	84	112	N/S	N/S	N/S	N/S	98
DNxHD 145		18.5	37	55.5	74	92.5	N/S	92.5	N/S	65
ProRes		18.5	37	55.5	74	N/S	N/S	N/S	N/S	65
DNxHD 100		14	28	42	56	70	84	70	150	67
J2k**		19*	38*	N/S	N/S	N/S	N/S	N/S	N/S	46
ProRes LT		13	26	39	52	N/S	N/S	N/S	N/S	46
XDCAM50		8	16	24*	32*	N/S	N/S	40	N/S	28
XDCAM35		5	10	15	N/S	N/S	N/S	25	N/S	18
XDCAM25		3.5	7	10.5	N/S	N/S	N/S	17.5	N/S	13
DVCPRO HD		14.5	29	43.5	N/S	N/S	N/S	72.5	145	51
AVC-Intra 50		8	16	N/S	N/S	N/S	N/S	N/S	N/S	28
AVC-Intra 100		14	28	N/S	N/S	N/S	N/S	N/S	N/S	50
ProRes Proxy		5	10	15	20	25	N/S	N/S	N/S	18
H264 Proxy		1	2	3	4	5	N/S	N/S	N/S	3.5
1:1 10-bit HD	720p/50	120	240	N/S	N/S	N/S	N/S	N/S	N/S	422
1:1 HD		89	178	N/S	N/S	N/S	N/S	N/S	N/S	313
DNxHD 185 X		23.5	47	70.5	94	117.5	N/S	117.5	N/S	83
DNxHD 185		23.5	47	70.5	94	117.5	N/S	117.5	N/S	83
ProRes HQ		23.5	47	70.5	94	N/S	N/S	N/S	N/S	83
DNxHD 120		16	32	48	64	80	N/S	75	150	53
ProRes		15	30	45	64	N/S	N/S	N/S	N/S	53
J2k**		16*	32*	N/S	N/S	N/S	N/S	N/S	N/S	57
ProRes LT		11	22	33	44	N/S	N/S	N/S	N/S	39

Resolution	Project Format	Number of Streams per client (MB/s)						Multi-cam (MB/s)		GB/Hour	
		1	2	3	4	5	6	4-way	9-way		
XDCAM50		8	16	24*	32*	N/S	N/S	40	N/S	28	
XDCAM35		5	10	N/S	N/S	N/S	N/S	25	N/S	18	
XDCAM25		3.5	7	N/S	N/S	N/S	N/S	17.5	N/S	13	
DVCPRO HD		8	16	N/S	N/S	N/S	N/S	40	N/S	28	
AVC-Intra 50		8	16	N/S	N/S	N/S	N/S	N/S	N/S	28	
AVC-Intra 100		14	28	N/S	N/S	N/S	N/S	N/S	N/S	50	
ProRes Proxy		4	8	12	16	20	24	N/S	N/S	14	
H264 Proxy		1	2	3	4	5	N/S	N/S	N/S	3.5	
1:1 10-bit HD		720p/29.97	71	142	N/S	N/S	N/S	N/S	N/S	N/S	250
1:1 HD			53	106	159	N/S	N/S	N/S	N/S	N/S	186
DNxHD 220 X	28		56	84	112	140	N/S	140	N/S	98	
DNxHD 220	28		56	84	112	140	N/S	140	N/S	98	
ProRes HQ	28		56	84	112	N/S	N/S	N/S	N/S	98	
DNxHD 145	18.5		37	55.5	74	92.5	N/S	92.5	N/S	65	
ProRes	18.5		37	55.5	74	N/S	N/S	N/S	N/S	65	
DNxHD 110	14		28	42	56	70	84	N/S	N/S	50	
J2k**	10*		20*	N/S	N/S	N/S	N/S	N/S	N/S	36	
ProRes LT	13		26	39	52	N/S	N/S	N/S	N/S	46	
DVCPRO HD	14.5		29	43.5	N/S	N/S	N/S	72.5	145	51	
1:1 10-bit HD	720p/25		60	120	N/S	N/S	N/S	N/S	N/S	N/S	211
1:1 HD		48	96	144	N/S	N/S	N/S	N/S	N/S	169	
DNxHD 90 X		12	24	36	48	60	N/S	60	120	42	
DNxHD 90		12	24	36	48	60	N/S	60	120	42	
ProRes HQ		12	24	36	48	N/S	N/S	N/S	N/S	42	
DNxHD 60		8	16	24	32	40	N/S	40	80	28	
ProRes		8	16	24	32	N/S	N/S	N/S	N/S	28	
J2k**		9*	18*	N/S	N/S	N/S	N/S	N/S	N/S	32	
ProRes LT		7	14	21	28	N/S	N/S	N/S	N/S	25	

Resolution	Project Format	Number of Streams per client (MB/s)						Multi-cam (MB/s)		GB/Hour
		1	2	3	4	5	6	4-way	9-way	
XDCAM35	720p/23.976	5	10	15	N/S	N/S	N/S	25	N/S	18
XDCAM25		3.5	7	10.5	N/S	N/S	N/S	17.5	N/S	13
AVC-Intra 50		8	16	N/S	N/S	N/S	N/S	N/S	N/S	28
AVC-Intra 100		14	28	N/S	N/S	N/S	N/S	N/S	N/S	50
1:1 10-bit HD		58	116	N/S	N/S	N/S	N/S	N/S	N/S	204
1:1 HD		46	92	138	N/S	N/S	N/S	N/S	N/S	162
DNxHD 90 X		11.5	24	35.5	46	57.5	N/S	57.5	115	40
DNxHD 90		11.5	24	35.5	46	57.5	N/S	57.5	115	40
ProRes HQ		11.5	24	35.5	46	N/S	N/S	N/S	N/S	40
DNxHD 60		7.5	16	22.5	30	37.5	N/S	37.5	75	26
ProRes		7.5	16	22.5	30	N/S	N/S	N/S	N/S	26
J2k**		8*	16*	N/S	N/S	N/S	N/S	N/S	N/S	29
ProRes LT		6.5	13	19.5	26	N/S	N/S	N/S	N/S	23
XDCAM35		5	10	N/S	N/S	N/S	N/S	25	N/S	18
XDCAM25		3.5	7	N/S	N/S	N/S	N/S	17.5	N/S	13
DVCPRO HD		14.5	29	43.5	N/S	N/S	N/S	72.5	145	51
AVC-Intra 50	8	16	N/S	N/S	N/S	N/S	N/S	N/S	28	
AVC-Intra 100	14	28	N/S	N/S	N/S	N/S	N/S	N/S	50	
ProRes Proxy	4	8	12	16	20	N/S	N/S	N/S	14	

(\*) Minimum Platform/Memory requirements must be met. Please refer to the Symphony/Media Composer ReadMe associated to the version of software you are using for detailed platform support.

(\*\*) Estimated average as compression is variable rate.

#### Legend

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange shaded cells indicate 10 Gb connectivity required.
- Yellow shaded cells indicate resolutions available for 3D stereoscopic
- N/S indicates not supported

### 8.3 Supported Stream Counts with Avid Non-Editor Ingest Devices

The following charts outline Avid supported ingest devices and stream counts. The bandwidth displayed is the suggested bandwidth limit setting by resolution to still ensure real-time playback. The GB/Hour column represents the use of a single stream.

Resolution	Device	Number of Streams per client (MB/s)				GB/Hour per stream
		1	2	3	4	
XDCAM-HD 17.5 Mb	AirSpeed 5000	10	20	30	40	36
XDCAM-HD 35 Mb	AirSpeed 5000	10	20	30	40	36
XDCAM-HD 50 Mb	AirSpeed 5000	10	20	30	40	36
DNxHD100	AirSpeed 5000	14	28	42	56	50
DNxHD145/120	AirSpeed 5000	20	40	60	80	65
DNxHD220/185	AirSpeed 5000	30	60	N/S	N/S	98
HDV 25 Mb	AirSpeed 5000	10	20	30	40	36
DV50	AirSpeed 5000	10	20	30	40	36
DV25	AirSpeed 5000	10	20	30	40	36
AVC-Intra 50	AirSpeed 5000	10	20	30	40	36
AVC-Intra 100	AirSpeed 5000	14	28	42	56	50
IMX50	AirSpeed 5000	10	20	N/S	N/S	36
IMX30	AirSpeed 5000	10	20	N/S	N/S	22
XDCAM-HD 17.5Mb	AirSpeed Multi Steam	10	20	30	40	36
XDCAM-HD 35Mb	AirSpeed Multi Steam	10	20	30	40	36
XDCAM-HD 50 Mb	AirSpeed Multi Steam	10	20	30	40	36
AVC-Intra 50Mb	AirSpeed Multi Steam	10	20	30	40	36
AVC-Intra 100Mb	AirSpeed Multi Steam	14	28	42	56	50
HDV 25 Mb	AirSpeed Multi Steam	10	20	30	40	36
DV 50	AirSpeed Multi Steam	10	20	30	40	36
DV 25	AirSpeed Multi Steam	10	20	30	40	36

Resolution	Device	Number of Streams per client (MB/s)				GB/Hour per stream
		1	2	3	4	
IMX50	AirSpeed Multi Steam	10	20	N/S	N/S	36
IMX30	AirSpeed Multi Steam	10	20	N/S	N/S	22
DV 25	AirSpeed Classic	10	20	N/S	N/S	22
DV 50	AirSpeed Classic	10	20	N/S	N/S	36
IMX50	AirSpeed Classic	10	20	N/S	N/S	36
IMX30	AirSpeed Classic	10	20	N/S	N/S	22
DNxHD 115	AirSpeed Classic	18	N/S	N/S	N/S	64
DNxHD 120	AirSpeed Classic	18	N/S	N/S	N/S	64
DNxHD 145	AirSpeed Classic	22	N/S	N/S	N/S	78
SD 1:1	AirSpeed Classic	25	N/S	N/S	N/S	88
MPEG-2	Avid Low-Res Encoder	2	4	6	8	7
MPEG-4	Avid Low-Res Encoder	200 kb	400 kb	600 kb	800 kb	1
DNxHD 145	AirSpeed Multi Steam	20	40	N/S	N/S	72
DNxHD 220	AirSpeed Multi Steam	30	N/S	N/S	N/S	108
H264	AirSpeed Multi Steam	1	2	3	4	3.5

**Legend**

- N/S indicates not supported
- Bandwidth limiting may be required to ensure the above ratings

**8.4 Supported Stream Counts with Avid Non-Editor Playback Devices**

The following chart outlines the supported stream counts for each playback device. The bandwidth displayed is the suggested bandwidth limit setting by resolution to still ensure real-time playback.

Resolution	Device	Number of Streams per client (MB/s)			
		1	2	3	4
XDCAM-HD 17.5 Mb	AirSpeed 5000	10	20	30	40
XDCAM-HD 35 Mb	AirSpeed 5000	10	20	30	40
XDCAM-HD 50 Mb	AirSpeed 5000	10	20	30	40

Resolution	Device	Number of Streams per client (MB/s)			
		1	2	3	4
DNxHD100	AirSpeed 5000	14	28	42	56
DNxHD145/120	AirSpeed 5000	20	40	60	80
DNxHD220/185	AirSpeed 5000	30	60	N/S	N/S
HDV 25 Mb	AirSpeed 5000	10	20	30	40
DV50	AirSpeed 5000	10	20	30	40
DV25	AirSpeed 5000	10	20	30	40
AVC-Intra 50Mb	AirSpeed 5000	10	20	30	40
AVC-Intra 100	AirSpeed 5000	14	28	42	56
IMX50	AirSpeed 5000	10	20	30	40
IMX30	AirSpeed 5000	10	20	30	40
XDCAM-HD 17.5Mb	AirSpeed Multi Steam	10	20	30	40
XDCAM-HD 35Mb	AirSpeed Multi Steam	10	20	30	40
XDCAM-HD 50 Mb	AirSpeed Multi Steam	10	20	30	40
AVC-Intra 50Mb	AirSpeed Multi Steam	10	20	30	40
AVC-Intra 100Mb	AirSpeed Multi Steam	10	20	30	40
DNxHD 145	AirSpeed Multi Steam	20	40	N/S	N/S
DNxHD 220	AirSpeed Multi Steam	30	N/S	N/S	N/S
HDV 25 Mb	AirSpeed Multi Steam	10	20	30	40
DV 50	AirSpeed Multi Steam	10	20	30	40
DV 25	AirSpeed Multi Steam	10	20	30	40
IMX50	AirSpeed Multi Steam	10	20	30	40
IMX30	AirSpeed Multi Steam	10	20	30	40
DV 25	AirSpeed Classic	6	12	N/A	N/A
DV 50	AirSpeed Classic	10	20	N/A	N/A
IMX50	AirSpeed Classic	10	20	N/A	N/A

Resolution	Device	Number of Streams per client (MB/s)			
		1	2	3	4
IMX30	AirSpeed Classic	6	12	N/A	N/A

Resolution	Device	Number of Streams per client (MB/s)			
		1	2	3	4
DNxHD 115	AirSpeed Classic	16	32	N/A	N/A
DNxHD 120	AirSpeed Classic	16	32	N/A	N/A
DNxHD 145	AirSpeed Classic	21	42	N/A	N/A
SD 1:1	AirSpeed Classic	25	50	N/A	N/A

### Legend

- N/S indicates not supported
- Bandwidth limiting may be required to ensure the above ratings
- When playing two tracks of compressed audio with H.264 media please budget 1.8 MB/sec. of bandwidth

## 9.0 Pro Tools Performance

The ISIS 4.6 client on ISIS 5000 supports Pro Tools versions 10 and 11. There is support for up to 9 clients per engine. For more specific details regarding Pro Tools on ISIS see the following URL:

<http://avid.custkb.com/avid/app/selfservice/search.jsp?DocId=371639>

## 10.0 Interplay Central Performance

The ISIS 4.0 release introduced support for Interplay Central on the ISIS 5000 product. For greater detail regarding Interplay Central please refer to the version of the ICS How to Buy Hardware Guide that corresponds with your ICS version, available on the Avid Knowledge Base.

The following stream counts are supported per Interplay Central server per engine for the most recent version using the G8 based server:

Resolution	Interplay Central		Interplay Sphere		iNews iOS	
	1 Gb Server Link	10 Gb Server Link	1 Gb Server Link	10 Gb Server Link	1 Gb Server Link	10 Gb Server Link
<b>AVC Intra 100, DNxHD 145, 45; DVCPRO-HD</b>	N/S	16 (12)	N/S	16 (12)	N/S	16 (12)
<b>AVC Intra 100</b>	N/S	10	N/S	10	N/S	10
<b>XDCAMHD 50, DNxHD 45</b>	12	24 (15)	12	24 (15)	12	24 (15)
<b>AVC intra 50</b>	10 (8)	10 (8)	10 (8)	10 (8)	10 (8)	10 (8)
<b>XDCAM EX 35, IMX50</b>	16	42 (34)	16	36 (30)	16	42 (34)
<b>XDCAM HD 35/17.5</b>	18	36 (24)	18	30 (20)	18	36 (24)
<b>DV50</b>	12	56 (36)	12	52 (32)	12	50 (36)
<b>DV 25; IMX 30/40</b>	20	42 (40)	20	42 (40)	20	42 (40)
<b>Proxy (h.264 - 2 Mbps)</b>	80 (70)	80 (70)	40 (32)	40 (32)	N/S	N/S
<b>Proxy (h.264 - 800 Kbps)</b>	120 (100)	120 (100)	60 (50)	60 (50)	N/S	N/S
<b>Proxy /h.263</b>	80	80 (80)	30 (24)	30 (24)	N/S	N/S

 Values in parenthesis reflect the use of a DL-360 G7 based server.

## 11.0 Adding a Single or Multiple Engines to a Storage Group

Use the tables below to determine the amount of time it required when adding a single engine to an existing storage group. Avid supports up to 50% of the engine rating for the total number of engines that will be present in the larger Storage Group. Please note that UHRC resolutions are not supported during redistribution operations.

### Time to Completion with no Bandwidth (Hours)

# of engines	Capacity Filled / Time to Completion		
	30%	60%	90%
<b>1-2 Engines</b> 2 TB drives	5	6	9
<b>2-3 Engines</b> 2 TB drives	5.5	11	18
<b>3-4 Engines</b> 2 TB drives	7	15	23
<b>4-5 Engines</b> 2 TB drives	8	17	24
<b>5-6 Engines</b> 2 TB drives	9	19	26

### Engine rating with client load during Add Redistribution (MB/sec)

	1 to 2	2 to 3 Engines	3 to 4 Engines	4 to 5 Engines	5 to 6 Engines
<b>All Read</b>	350	525	700	875	1050
<b>50% Mixed Load</b>	300	450	600	750	900
<b>All Write</b>	200	300	400	500	600

### Time to Completion with 50% per engine bandwidth (Hours)

# of engines	Capacity Filled / Time to Completion		
	30%	60%	90%
<b>1-2 Engines</b> 2 TB	6	12	18
<b>2-3 Engines</b> 2 TB	7	13	20
<b>3-4 Engines</b> 2 TB	9	18	26
<b>4-5 Engines</b> 2 TB	10	20	28
<b>5-6 Engines</b> 2 TB	11	22	30

## 12.0 Removing an Engine from a Storage Group

Avid supports up to 50% client load per the total number of engines remaining in the Storage Group following an engine removal. The table below outlines the engine ratings by configuration. In general when removing a single engine with no client load the data will move off the engine at a rate of about 240 MB/sec on average. If you apply 50% mixed load to the system that rate will decrease to about 140 MB/sec on average.

### Engine rating with client load during Remove Redistribution (MB/sec)

	2 to 1 Engines	3 to 2 Engines	4 to 3 Engines	5 to 4 Engines	6 to 5 Engines
<b>All Read</b>	175	350	525	700	875
<b>50% Mixed Load</b>	150	300	450	600	750
<b>All Write</b>	100	200	300	400	500

## 13.0 Editor Hardware and Software Used During Testing

The following chart describes the hardware and software used during testing this release. This table does not reflect all platforms that are supported.

<b>Platform</b>	<b>OS</b>	<b>CPU</b>	<b>Memory</b>	<b>Editor Version</b>	<b>ISIS Client</b>
HP z820	Windows 8.1 64-bit Windows 7 64-bit SP1	8 Core 2.7 GHz Intel Xeon	16 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0	v4.6
Lenovo C30	Windows 8.1 64-bit Windows 7 64-bit SP1	8 Core 2.2 GHz Intel Xeon	16 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0	v4.6
HP z800	Windows 8.1 64-bit Windows 7 64-bit SP1	6 Core 2.67GHz Intel Xeon	12 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0	v4.6
HP z820	Red Hat Linux 6.2/6.3	8 Core 2.7 GHz Intel Xeon	16 GB	N/A	v4.6
HP z420	Windows 8.1 64-bit Windows 7 64-bit SP1	6 Core 3.20 GHz Intel Xeon	8 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0	v4.6
Lenovo S30	Windows 8.1 64-bit Windows 7 64-bit SP1	6 Core 3.20 GHz Intel Xeon	16 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0	v4.6
HP z400	Windows 8.1 64-bit Windows 7 64-bit SP1	6 Core 3.33GHz Intel Xeon	12 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
HP Z230*	Windows 8.1 64-bit	4 Core E3-1245 v3 3.40 GHz Intel Xeon	8 GB	Media Composer 7.0	v4.6
Dell T-1700*	Windows 8.1 64-bit	4 Core E3-1245 v3 3.40 GHz Intel Xeon	8 GB	Media Composer 7.0	v4.6
Lenovo E32*	Windows 8.1 64-bit	4 Core E3-1245 v3 3.40 GHz Intel Xeon	8 GB	Media Composer 7.0	v4.6
HP Z220	Windows 7 64-bit SP1	4 Core E3-1245 3.40 GHz Intel Xeon	8 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6

HP Z210	Windows 7 64-bit SP1	4 Core E31270 3.40 GHz Intel Xeon	4 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
HP 8570w	Windows 7 64-bit SP1	i7-3820QM 2.7 GHz	8 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
HP 8760w	Windows 7 64-bit SP1	4 Core 2.3 GHz Intel i7	4 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
Dell M6600	Windows 7 64-bit SP1	4 Core 2.20 GHz Intel i7	4 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
Mac Pro (Westmere)	10.8.5 – 10.9	2 X 2.6 GHz 6 Core Intel Xeon	12 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
Mac Pro (Westmere)	10.8.5 – 10.9	2 X 2.4 GHz Quad Core Intel Xeon	6 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
MacBook Pro 15"	10.8.5 – 10.9	2.3/2.6/2.7 GHz I7 quad core Retina & Thunderbolt	8 GB	Media Composer 6.5	v4.6
Mac Pro (Nehalem)	10.8.5 – 10.9	2 x 2.66 GHz Dual- Core Intel Xeon	6 GB	Media Composer 7.0 Media Composer 6.5 Media Composer 6.0 Media Composer 5.5	v4.6
iMac	10.8.5 – 10.9	3.6 GHz Intel Core i5	4 GB	Media Composer 7.0 Media Composer 6.5	v4.6

\* Platform requires the Intel 18.3 driver family or later. The 18.3 kit is not included with the ISIS 4.5 release, but has been made available at Avid's Download Center. For 4.6, the 18.6 kit is included.

Capabilities and limitations for individual systems listed above can be found on Avid's Knowledge Base.

## 14.0 Supported Stream Counts with Apple Final Cut Pro Editors

Avid has tested Final Cut Pro version 7 as a client in the Avid ISIS 5000 shared storage environment. Testing was done with Avid ISIS v3.2 Final Cut Pro v7.0.3 and Media Composer 5.0. There is no Avid restriction on the QuickTime version. Use the QuickTime version recommended in the Final Cut Pro application. QuickTime v7.6 was the version used in the Avid testing. The following provides information on how many streams were qualified per client at various resolutions.

Media for both Final Cut Pro and Avid Media Composer are now able to co-exist in the same storage group:

**Avid Interplay Access supports the Mac OSX platform, and through this application Final Cut Pro QuickTime files and projects can be checked into Interplay. Any Interplay workstation can search for these files and edit their Interplay metadata, though there is currently no tightly integrated workflow between Avid editors and Final Cut Pro within Interplay.** Having a higher ratio of Avid to Final Cut Pro editors in the same Storage Group will cause a reduction in the overall aggregate bandwidth rating. Avid ISIS shared storage and Avid editors are tuned to read / write optimal patterns to ISIS storage. We cannot control the read/write patterns of 3rd party editors (like FCP 7), and thus these editors issue multiple small reads that require additional processing and seek operations that affect the overall performance of all attached editors (both 3rd party and Avid editor). Therefore the overall performance of ISIS is affected when mixing Avid and non-Avid editors.

Additional stream counts for individual editors may be achieved by reducing the overall client count. Altering the playback video quality or playback frame rate will also increase stream counts for some resolutions.

The following are guidelines used with Final Cut Pro clients on Avid ISIS 5000.

- Final Cut Pro editing software was characterized with the AJA KONA™3 hardware. The complete Apple Studio 2 bundle was installed.
- The Avid ISIS 5000 Client Manager Preference settings follow the same guidelines as for Avid editors. The default setting is set to Medium Resolution (limited to resolutions that draw 16 MB/s or less). Use the High Resolution setting when working with High Definition media (resolutions that draw higher than 16 MB/s). For data rate specifications, see the data in the following tables.
- Scaling the Avid ISIS 5000 environment is based on the amount of bandwidth an ISIS 5000 engine (or two engines) is able to provide. A single ISIS 5000 engine is comprised of 16 drives and can produce upwards of 250 MB/s of throughput. The tables below illustrate the engine ratings in an all Final Cut Pro storage group as well as an environment with Final Cup Pro and Avid editors mixed together in the same storage group. Scaling an Avid ISIS 5000 beyond a single engine effectively scales in a linear fashion based on a single engines performance

### 14.1 Engine Bandwidth Performance (MB/s) with Final Cut Pro Clients

#### Final Cut Pro Only

# of Engines	All Reads	All Writes	Aggregate
Available B/W per engine	250 MB/s	200 MB/s	225 MB/s

### Final Cut Pro and Avid Editors in a Mixed Environment

# of Engines	All Reads	All Writes	Aggregate
Available B/W per engine	250 MB/s	200 MB/s	200 MB/s

The following charts define the bandwidth used per resolution and the recommended stream count for each. Attempting to increase the number of streams beyond what is shown may result in unexpected results for the Client, but should not affect the ISIS system.

Take the following into consideration when reading the tables included in this section.

All bandwidth ratings have been adjusted to include up to 8 tracks audio

Data in this document was obtained using the Final Cut Pro v7.0.3 editing application.

All bandwidth ratings have been adjusted to include up to 8 tracks of 16 bit audio @ 48 KHz. The sequence used for testing has two second audio and video cuts offset by one second.

### DV

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
DV 25	25i NTSC	4	8	12	16	20	24	14
DV 25	25i PAL	4	8	12	16	20	24	14
DV 50	30i NTSC	8	16	24	32	40	48	28
DV 50	30i PAL	8	16	24	32	40	48	28

### Legend

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) connectivity required
- N/S indicates not supported

### 720p

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
ProRes NQ 59	720p/23.98	9	18	27	36	45	54	32
ProRes HQ 88		12	24	36	48	60	N/S	42
ProRes Proxy 19	720p/25	3	6	9	12	15	18	11
ProRes NQ 61		9	18	27	36	45	54	31
ProRes HQ 92		13	26	39	52	65	78	46
ProRes NQ 73	720p/29.97	11	22	33	44	55	66	38

ProRes HQ 110		15	30	45	60	75	90	53
ProRes Proxy 38	720p/50	6	12	18	24	30	36	21
ProRes NQ 122		16	32	48	64	80	96	57
ProRes HQ 184		24	48	72	96	N/S	N/S	84
ProRes NQ 147	720p/59.94	20	40	N/S	N/S	N/S	N/S	70
ProRes HQ 220		29	58	N/S	N/S	N/S	N/S	102

**Legend**

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) connectivity required
- N/S indicates not supported

**1080i**

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
1:1 10 bit	1080i/59.94	150	N/S	N/S	N/S	N/S	N/S	527
1:1 8 bit	1080i/59.94	125	N/S	N/S	N/S	N/S	N/S	439
ProRes NQ 117	1080i/23.98	16	32	48	64	N/S	N/S	56
ProRes HQ 176		23	46	69	N/S	N/S	N/S	81
ProRes Proxy 38	1080i/25	6	12	18	24	30	36	21
ProRes NQ 122		16	32	48	64	80	96	57
ProRes HQ 184		24	48	72	96	N/S	N/S	84
ProRes Proxy 45	1080i/29.97	7	14	21	28	35	42	24
ProRes NQ 147		20	40	60	N/S	N/S	N/S	70
ProRes HQ 220		29	58	N/S	N/S	N/S	N/S	102

**Legend**

- N/S indicates not supported
- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) connectivity required
- Orange shaded cells indicate 10 Gb connectivity required

## PAL / NTSC

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
ProRes Proxy PAL 12	PAL	3	6	9	12	15	18	10
ProRes LT PAL 28		5	10	15	20	25	30	17
ProRes NQ PAL 41		7	14	21	28	35	42	24
ProRes HQ PAL 61		9	18	27	36	45	54	31
ProRes Proxy NTSC 12	NTSC	3	6	9	12	15	18	10
ProRes LT NTSC 30		5	10	15	20	25	30	17
ProRes NQ NTSC 42		7	14	21	28	35	42	24
ProRes HQ NTSC 63		9	18	27	36	45	54	31

### Legend

- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) connectivity required

## Uncompressed

Resolution	Number of Streams per client (MB/s)						GB/Hour
	1	2	3	4	5	6	
Uncompressed 8bit 4:2:2 SD 525i 23.98	32	61	92	124	156	188	113
Uncompressed 8bit 4:2:2 SD 625i 25	39	75	113	149	188	225	137
Uncompressed 8bit 4:2:2 SD 525i 29.97	37	74	113	152	189	226	130
Uncompressed 8bit 4:2:2 HD 1280x720p 23.98	69	134	N/S	N/S	N/S	N/S	243
Uncompressed 8bit 4:2:2 HD 1280x720p 25	73	144	N/S	N/S	N/S	N/S	257
Uncompressed 8bit 4:2:2 HD 1280x720p 29.97	58	N/S	N/S	N/S	N/S	N/S	204
Uncompressed 8bit 4:2:2 HD 1280x720p 50	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Uncompressed 10bit 4:2:2 SD 525i 23.98	39	77	115	154	192	230	137
Uncompressed 10bit 4:2:2 SD 625i 25	49	98	144	194	N/S	N/S	173
Uncompressed 10bit 4:2:2 SD 525i 29.97	48	96	144	192	N/S	N/S	168

Uncompressed 10bit 4:2:2 HD 1280x720p 23.98	N/S						
Uncompressed 10bit 4:2:2 HD 1280x720p 25	N/S						
Uncompressed 10bit 4:2:2 HD 1280x720p 29.97	N/S						
Uncompressed 10bit 4:2:2 HD 1280x720p 50	N/S						

*Legend*

- N/S indicates not supported
- White cells indicate 1 Gb connectivity required
- Light shaded cells indicate Dual 1 Gb (2 Gb) connectivity required
- Orange shaded cells indicate 10 Gb connectivity required

## 14.2 Final Cut Pro Editor Hardware and Software Used During Testing

The following chart describes the Final Cut Pro and Avid hardware and software used during testing in a complete Final Cut Pro environment and in a mixed environment.

Platform	OS	CPU	Memory	Editor Version	ISIS Client
Mac Pro	10.6.8	2 x 2.66GHz Quad-Core Intel Xeon (Nehalem)	12GB	Media Composer v5.5.3 Media Composer 6.x	v4.6
Mac Pro	10.6.8 and 10.7.1	2 x 2.8GHz Quad-Core Intel Xeon (Harpertown)	4GB	Final Cut Pro 7.0.3	v4.6
Mac Pro	10.6.8	2 x 2.66GHz Quad-Core Intel Xeon (Nehalem)	12GB	Media Composer v5.5.3 Media Composer 6.x	v4.6
Mac Pro	10.6.8 and 10.7.1	2 x 2.8GHz Quad-Core Intel Xeon (Harpertown)	4GB	Final Cut Pro 7.0.3	v4.6

## 15.0 Engine Bandwidth Performance (MB/s) with Adobe Premiere Clients

Avid has tested Adobe Premiere as a client in the Avid ISIS 5000 shared storage environment. Adobe Premiere v6.x and Media Composer v6.0 testing was done using Avid ISIS v4.1 client software in an ISIS v4.0.1 infrastructure. The following are guidelines used with Adobe Premiere clients on Avid ISIS 5000.

- Adobe Premiere 10 Gb clients are not supported on ISIS 5000
- Media from both Adobe Premier and Avid Media Composer are able to co-exist in the same storage group. For optimal performance you should not mix Avid editors and CS5 editors in the same Storage Group.
- Adobe Premiere was qualified on Windows 7 64-bit and Macintosh v10.7.3 64-bit operating systems.
- Adobe Premiere clients follow the same guidelines as for Avid editors in regards to the Avid ISIS Client Manager Preference settings. The default setting is set to Medium Resolution (limited to resolutions that draw 16 MB/s or less). Use the High Resolution setting when working with High Definition media (resolutions that draw higher than 16 MB/s). There are some HD resolutions that draw less than 16 MB/s for a single stream, but you should still use the High Resolution setting (for example, XDCAMHD 50). For data rate specifications, see the data in the following tables.

The tables below illustrate the engine ratings is an all Adobe Premiere storage group as well as an environment with Adobe Premiere and Avid editors mixed together in the same storage group. Scaling an Avid ISIS 5000 beyond a single engine effectively scales in a linear fashion based on a single engines performance

## Adobe Premiere Only

# of Engines	All Reads	All Writes	Aggregate
Available B/W per Engine Single 1 Gb connection	180 MB/s AVC intra is 130 MB/s	120 MB/s	120 MB/s
Available B/W per Engine Dual 1 Gb connection	200 MB/s AVC intra is 135 MB/s  Engine ratings are better with some DVC PRO resolutions. Some AVC resolutions can cause the Engine rating to fall below the expected rate.	140 MB/s	140 MB/s

## Adobe Premiere and Avid Editors in a Mixed Environment

# of Engines	All Reads	All Writes	Aggregate
Available B/W per engine	180 MB/s  <ul style="list-style-type: none"> <li>When you have Adobe and Avid clients, better performance is expected if you have more Avid clients than Adobe clients.</li> <li>Engine ratings are better with some DVC PRO resolutions. Some AVC resolutions can cause the Engine rating to fall below the expected rate.</li> </ul>	120 MB/s	120 MB/s

The following provides information on how many streams were qualified per client at various resolutions. These tables define the bandwidth used per resolution and the recommended stream count for each. Attempting to increase the number of streams beyond what is shown may result in unexpected results for the Client, but should not affect the ISIS system.

Take the following into consideration when reading the tables included in this section.

- All bandwidth ratings have been adjusted to include up to 8 tracks audio
- Data in this document was obtained using the Adobe Premiere v6.x editing application.
- All Adobe Premiere client data was gathered using single and dual 1 Gb port connections.
- All bandwidth ratings have been adjusted to include up to 8 tracks of 16 bit audio @ 48 KHz. The sequence used for testing has two second audio and video cuts offset by one second.

DVC Pro SD (Windows x64 and Macintosh 10.7.5)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
SD DVC Pro50 720*480	NTSC 29.97	10	20	30	39	49	58	35.2
SD DVC Pro50 720*576	PAL 25	10	20	30	40	50	60	35.2

### Legend

- N/S indicates not supported
- Light shaded cells indicate 2 X 1 Gb

### 720p (Windows 7/8 x64 and Macintosh 10.8.5)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
DVCPROHD 960*720 23.976	720p/24	9	18	27	37	45	54	31.6
DVCPROHD 960*720 50	720p/50	18	35	51	69	86	NS	59.8
DVCPROHD 960*720 59.94	720p/60	18	35	52	69	86	NS	59.8

#### Legend

- N/S indicates not supported
- Light shaded cells indicate 2 X 1 Gb

### 720p (Mac OS 10.8.5)

AVC-Intra 50 960*720 23.976	720p/24	6	11	19	25	30	35	21.1
AVC-Intra 50 960*720 25	720p/25	6	13	20	26	32	42	21.1
AVC-Intra 50 960*720 29.97	720p/30	7	14	19	25	33	42	21.1
AVC-Intra 50 960*720 50	720p/50	11	20	28	N/S	N/S	N/S	35.2
AVC-Intra 50 960*720 59.94	720p/60	9	19	N/S	N/S	N/S	N/S	35.2
AVC-Intra 100 1280*720 23.976	720p/24	9	18	29	35	47	58	28.1
AVC-Intra 100 1280*720 25	720p/25	10	21	30	45	57	N/S	35.2
AVC-Intra 100 1280*720 29.97	720p/30	10	20	28	45	53	N/S	35.2
AVC-Intra 100 1280*720 50	720p/50	20	41	N/S	N/S	N/S	N/S	59.8
AVC-Intra 100 1280*720 59.94	720p/60	18	38	N/S	N/S	N/S	N/S	59.8

### 720p (Windows 7/8 x64)

AVC-Intra 50 960*720 23.976	720p/24	5	10	18	22	28	N/S	21.1
AVC-Intra 50 960*720 25	720p/25	7	14	21	28	NS	N/S	21.1
AVC-Intra 50 960*720 29.97	720p/30	8	15	24	32	NS	N/S	21.1
AVC-Intra 50 960*720 50	720p/50	12	20	N/S	N/S	N/S	N/S	35.2
AVC-Intra 50 960*720 59.94	720p/60	11	N/S	N/S	N/S	N/S	N/S	35.2
AVC-Intra 100 1280*720 23.976	720p/24	10	19	28	37	N/S	N/S	28.1
AVC-Intra 100 1280*720 25	720p/25	12	21	31	NS	NS	NS	35.2
AVC-Intra 100 1280*720 29.97	720p/30	11	20	31	NS	NS	NS	35.2
AVC-Intra 100 1280*720 50	720p/50	18	N/S	N/S	N/S	N/S	N/S	59.8
AVC-Intra 100 1280*720 59.94	720p/60	19	N/S	N/S	N/S	N/S	N/S	59.8

#### Legend

- N/S indicates not supported
- Light shaded cells indicate 2 X 1 Gb

### 1080i (Mac OS 10.8.5)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
DVC Pro HD 1440*1080 25	1080i/50	29	54	83	110	126	N/S	59.8
DVC Pro HD 1280*1080 29.97	1080i/60	20	40	60	N/S	N/S	N/S	59.8

### 1080i (Windows 7/8 x64)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
DVC Pro HD 1440*1080 25	1080i/50	27	53	79	105	NS	NS	59.8
DVC Pro HD 1280*1080 29.97	1080i/60	18	35	53	69	86	100	59.8

#### Legend

- N/S indicates not supported
- Light shaded cells indicate 2 X 1 Gb

### 1080p (Mac OS 10.8.5)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
AVC-Intra 50 1440*1080 23.976	1080p/24	10	17	25	N/S	N/S	N/S	28.1
AVC-Intra 50 1440*1080 25	1080p/25	11	20	35	N/S	N/S	N/S	35.2
AVC-Intra 50 1440*1080 29.97	1080p/30	10	20	31	N/S	N/S	N/S	35.2
AVC-Intra 100 1920*1080 23.976	1080p/24	15	30	N/S	N/S	N/S	N/S	49.2
AVC-Intra 100 1920*1080 25	1080p/25	27	51	N/S	N/S	N/S	N/S	59.8
AVC-Intra 100 1920*1080 29.97	1080p/30	18	N/S	N/S	N/S	N/S	N/S	59.8

### 1080p (Windows 7/8 x64)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
AVC-Intra 50 1440*1080 23.976	1080p/24	10	20	NS	NS	NS	NS	28.1
AVC-Intra 50 1440*1080 25	1080p/25	11	21	NS	NS	NS	NS	35.2
AVC-Intra 50 1440*1080 29.97	1080p/30	11	21	NS	NS	NS	NS	35.2
AVC-Intra 100 1920*1080 23.976	1080p/24	16	27	NS	NS	NS	NS	49.2
AVC-Intra 100 1920*1080 25	1080p/25	28	NS	NS	NS	NS	NS	59.8
AVC-Intra 100 1920*1080 29.97	1080p/30	18	NS	NS	NS	NS	NS	59.8

#### Legend

- N/S indicates not supported
- Light shaded cells indicate 2 X 1 Gb

### XDCAM HD422 (Windows 7/8 x64 and Macintosh 10.8.5)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hour
		1	2	3	4	5	6	
XDCAM HD422 CBR_25	1080i/50	14	25	34	45	53	63	35.2
XDCAM HD422 CBR_29.97	1080i/60	17	27	37	46	55	65	35.2
XDCAM HD422 CBR_23.98	1080p/24	13	23	33	42	52	61	35.2
XDCAM HD422 CBR_25	1080p/25	15	24	35	44	53	62	35.2
XDCAM HD422 CBR_29.97	1080p/30	18	27	38	47	56	66	35.2
XDCAM HD422 CBR_50	720p/50	17	30	40	50	60	N/S	35.2
XDCAM HD422 CBR_59.94	720p/60	17	28	38	49	60	N/S	35.2

#### Legend

- Light shaded cells indicate 2 X 1 Gb

### Apple ProRes (Mac OS 10.8.5)

Resolution	Project Format	Number of Streams per client (MB/s)					
		1	2	3	4	5	6
ProRes 422 HQ	1080p/24	28	56	85	111	N/S	N/S
ProRes 422 HQ	1080p/25	46	80	101	N/S	N/S	N/S
ProRes 422 HQ	1080p/30	34	68	101	N/S	N/S	N/S
ProRes 422 HQ	1080p/50	56	N/S	N/S	N/S	N/S	N/S
ProRes 422 HQ	1080p/59.94	65	N/S	N/S	N/S	N/S	N/S
ProRes 422 HQ	720x486p29.97	13	26	39	52	65	N/S
ProRes 422 HQ	720p24	17	32	48	64	80	N/S
ProRes 422 HQ	720p50	30	60	89	N/S	N/S	N/S
ProRes 4444	1080p30	50	N/S	N/S	N/S	N/S	N/S
ProRes 422 720p59.94	720p59.94	25	49	72	N/S	N/S	N/S
ProRes 422	1080p25	30	59	89	N/S	N/S	N/S
ProRes 422 LT	1080p50	26	52	79	N/S	N/S	N/S
ProRes 422 Proxy	1080p50	13	27	41	N/S	N/S	N/S

#### Legend

- N/S indicates not supported
- Light shaded cells indicate 2 X 1 Gb

### Apple ProRes (Windows 7/8 x64)

Resolution	Project Format	Number of Streams per client (MB/s)					
		1	2	3	4	5	6
ProRes 422 HQ	1080p/24	33	N/S	N/S	N/S	N/S	N/S
ProRes 422 HQ	1080p/25	50	N/S	N/S	N/S	N/S	N/S
ProRes 422 HQ	1080p/30	41	N/S	N/S	N/S	N/S	N/S
ProRes 422 HQ	1080p/50	N/S	N/S	N/S	N/S	N/S	N/S
ProRes 422 HQ	1080p/59.94	N/S	N/S	N/S	N/S	N/S	N/S
ProRes 422 HQ	720x486p29.97	11	22	33	44	54	64
ProRes 422 HQ	720p24	14	28	42	54	67	N/S

Resolution	Project Format	Number of Streams per client (MB/s)					
		1	2	3	4	5	6
ProRes 422 HQ	720p50	26	52	N/S	N/S	N/S	N/S
ProRes 4444	1080p30	N/S	N/S	N/S	N/S	N/S	N/S
ProRes 422 720p59.94	720p59.94	20	41	N/S	N/S	N/S	N/S
ProRes 422	1080p25	27	N/S	N/S	N/S	N/S	N/S
ProRes 422 LT	1080p50	22	44	68	N/S	N/S	N/S
ProRes 422 Proxy	1080p50	12	25	N/S	N/S	N/S	N/S

**Legend**

- N/S indicates not supported
- Light shaded cells indicate 2 X 1 Gb

**15.1 Adobe Premiere Hardware and Software Used During Testing**

The following chart describes the Adobe Premier and Avid hardware and software used during testing in a complete Adobe Premier environment and in a mixed environment.

Platform	OS	CPU	Memory	Editor Version	ISIS Client
HP z400	Windows 7 64-bit SP1	W3550 3.06 8MB/1066 Quad-Core Intel Xeon	6 GB	Adobe Premiere v6.x	v4.6
Mac Pro	10.8.5	2 x 2.8GHz Quad-Core Intel Xeon (Harpertown)	6GB	Adobe Premiere v6.x	v4.6