Avid® ISIS® | 5500 - 5000 v4.7.6

Performance and Redistribution Guide

Change History

Date	Release	Changes
10/20/2015	4.7.6	• Added support for Media Composer v8.4
6/12/2015	4.7.4 (June Update)	• Added Section 15 “Moving a Workspace Between Storage Groups” to provide general bandwidth guidance.
4/29/2015	4.7.4 (April Update)	• Updated FCPX Uncompressed data table. • Added XAVC to Media Composer tables • Added support for Media Composer v8.3.1
2/12/2015	4.7.4	• Added “What’s New in v4.7.4” • Updates to several tables & table formats • Added new tables in section 11.3
11/14/2014	4.7.3	• Clarify language regarding performance with real-time applications • Updates to section 9.1 • Update URL in section 10 • Update URL in section 15.2 • Updates to section 16 • Corrected Adobe Premiere version
6/10/2013	4.7	• First draft of 4.7 guide
12/1/2013	4.6	• Add new OS and editor version support • Make table headings repeat across pages
9/30/2013	4.5	• First Draft • Add/Remove redistribution with load • New client support (Win 8 and RedHat) • 5500 64 TB engine • New resolution support (XAVC and 2K with DS 11.x) • Updated FCP and Adobe Premiere tested streams
12/10/2012	4.2	• Added What’s new for 4.2/4.0.3 • Updated to include ISIS 2000-120 TB • Updated Editor version support • Added new CS6 results • Updated ICPS/ICS section • General revision updates
9/10/2012	v4.1	• Added ISIS 2000 • Added new platforms tested • Added DNxHD 100 and J2k stream counts
6/6/2012	v4.0	• Added Airspeed 5000 to sections 5.3 and 5.4 • Updated the stream counts for Interplay Central in section 7

This document provides performance guidance for the Avid ISIS v4.7 release, and includes charts detailing the bandwidth required for supported resolutions in multiple formats. Expected performance and the duration of redistributions have been outlined. This release supports Symphony/Media Composer v8.x, 7.0.x and 6.5.x.

The performance and bandwidth data included in this document were observed during testing at Avid, and do not represent a guarantee of performance or error-free operation. Avid recommends using a play-out server for play-to-air workflows.

Contents

1.0 What's New for ISIS 5500 – 5000 v4.7.6

For a complete list of features new to 4.7.6 refer to the Avid ISIS ReadMe. This document only covers performance-related features for ISIS 5500-5000.

- Support for Media Composer 8.4

2.0 What's New for ISIS 5500 – 5000 v4.7.4

For a complete list of features new to 4.7.4 refer to the Avid ISIS ReadMe. This document only covers performance-related features for ISIS 5500-5000.

- Support for Media Composer 8.3 (also supported on ISIS 4.7.3)
- FCPX 10.1.2 support and related configuration note.
- New Platform support: HP, Dell, Lenovo
- Support for uncompressed UHD (23.976 DPX) on 2 X 10 Gb Mac OS v10.10 "Yosemite"
- Support for new proxy resolutions in Media Composer, including multi-cam

3.0 What's new for ISIS 5500 - 5000 v4.7

For a complete list of features new to 4.7 refer to the Avid ISIS ReadMe. This document only covers performance-related features for ISIS 5500-5000.

- The ISIS | 5500 and ISIS 5000 now support up to 12 Engines in an ISIS System.
- The v4.7 release supports real-time, collaborative high-resolution workflows with third-party creative applications with ISIS online systems.
- The v4.7 release supports dual 10 Gb network connections on all ISIS systems for higher bandwidth.
- A Redistribution Monitor now displays progress and estimated time to complete.
- This release supports 10 Gb clients using Adobe Premiere Pro.
- This release supports Red Hat Enterprise Linux versions 6.2, 6.3, and 6.5 on ISIS clients.

4.0 What's new for ISIS 5000 v4.6

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

5.0 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. Avid recommends 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.

- You can now move workspaces between storage groups on ISIS 5500 and 5000. Workspaces can be moved while clients are accessing the system. See the Avid ISIS Administration Guide for more information.
- 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.
- You can now mix 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 must be copied to another location.

6.0 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 Avid ISIS 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 Premiere sections of this document.

7.0 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.

8.0 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 *Avid ISIS v4.0 ReadMe*.

The following performance-related features were added in the Avid ISIS v4.0 release:

- 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 the *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, as follows:
    - 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

9.0 ISIS 5000 10 Gb Clients

Avid ISIS v4.0 added support for Windows and Macintosh ultra-high resolution clients (UHRC). The Myricom 10-Gb and 2 X 10-Gb Ethernet adapters have been qualified. 10-Gb adapters are supported on Windows XP, Windows Vista, Windows 7, Windows 2008, Windows 8/8.1, Macintosh Snow Leopard (10.6.8), Macintosh Lion (up to v10.7.x), Macintosh Mountain Lion (10.8.x) and Macintosh Mavericks (10.9.x) operating systems for Avid editing clients. The 2 X 10 Gb Ethernet adapters have been qualified on Windows 7, Windows 8/8.1 and Macintosh Mavericks (10.9.x) operating systems. ISIS v4.0 also introduced 10 Gb client support for Red Hat® Enterprise Linux®v6.2, 6.3 and 6.5. 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 or later infrastructure.

10.0 Engine Performance

The ISIS 5000 scales in a linear fashion (up to 12 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

10.1 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 does not fall in line with the approved aggregate rating of 300 MB/s for a single ISIS 5000 engine. To remedy this problem, stop the DNxHD220 writer, freeing up 28 MB/s of bandwidth. This brings the total bandwidth consumed down to 295 MB/s which falls 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 falls 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 does 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.

10.2 Performance Guidance During Drive Rebuilds

In the event a drive needs to be replaced and a rebuild initialized, follow the guidance below for estimations of the 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.

Estimated 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

10.3 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 used is 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 falls 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 used is 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 does 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.

11.0 Tested Stream Counts

11.1 High Resolution Collaboration (2K/4K/5K) Using AMA

For the ISIS 4.7 release Avid has tested several 4K and 5K based formats using Media Composer, via AMA in a 1080p project, as well as using several 3rd party applications commonly used with these formats. The table below describes which formats have been observed to work successfully with the 4.7 release using a single stream of each. These resolutions also have platform requirements; see each application's documentation.

				Application Supported	
Format/Codec	**Bit Depth**	**Frame Rate**	**Bandwidth (MB/sec)**	**Mac**	**Windows**
Avid Image Sequencer (3840X2160)	10	24	760	Media Composer 8.3 or later Mac OS 10.10 (Yosemite) required.	Media Composer 8.1 or later
REDCODE 5K 8:1	12 bit	59.94	84	Adobe Premiere Pro CC AutoDesk Smoke Media Composer 7	Media Composer 7 Media Composer 8
REDCODE 5K 4:1	12 bit	24	118	Premiere Pro CC Black Magic Resolve	Media Composer 7 Media Composer 8 Adobe Premiere Pro CC
REDCODE 5K 8:1	12 bit	24	59	Premiere Pro CC	Media Composer 7 Media Composer 8
ProRes 422 HQ 4K	10 bit	24	150	Adobe Premiere Pro CC FCP-X	Adobe Premiere Pro
XAVC 422 4K	10 bit	24	30	FCP-X, AutoDesk Smoke	Media Composer 7 Media Composer 8 Adobe Premiere Pro CC
F55 Raw 4K	16 bit	24	120	Media Composer 7, 8	Media Composer 7 Media Composer 8 Adobe Premiere Pro
F55 Raw 2K	16 bit	24	30	Media Composer 8	Media Composer 8 Adobe Premiere Pro

Legend

- Light purple cells indicate 2 X 10 Gb, UHRC client type, connection required.
- Gray cells indicate 2 X 1 Gb or 10 Gb connectivity required. UHRC resolutions are not supported during redistribution.
- Orange cells indicate 10 Gb, UHRC client type, connection required.

11.2 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.

11.3 Tested Stream Counts with Avid Editors

Media Composer 8.3 has introduced several new project types and formats in the 2K, UHD and 4K space, as well as the DNxHR codec to go along with those. Because stream counts will vary greatly depending on the machine type and the timeline setting, from now on this guide will provide information only about the bandwidth usage for a single stream and the storage consumption associated with it. For specific platform requirements when using these high resolution projects, see the Media Composer 8.3 ReadMe.

The charts in this section define the bandwidth used per resolution and a recommended stream count, with the exception mentioned previously. Consider the following 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.

- The ISIS 4.7 release introduces support for a 2 X 10 Gb NIC (Myricom 10G-PCIE2-8B2-2S) to increase overall throughput. . It can be connected in Zones 1, 2 and 3 on different subnets, or the same subnet, although the former is preferred for resiliency.
- 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. 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 are available on Macintosh only and are indicated by italics.
- 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 involve switching the video quality mode during playback operations (for example, Draft or Full Quality).
- All streams counts are based on a single engine. With an additional engine, some stream counts might 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 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/Hr
		1	2	3	4	5	6	7	8	4-way	9-way	
DV 25	30i NTSC PAL	4	8	12	16	20	24	N/T	N/T	20	40	14
DV 50	30i NTSC PAL	8	16	24	32	40	48	N/T	N/T	40	80	28

Legend

- White cells indicate 1 Gb connectivity required
- Shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- N/T indicates not tested

MPEG

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/Hr
		1	2	3	4	5	6	7	8	4-way	9-way	
MPEG 30	30i NTSC 25i PAL	4	8	12	16	20	24	N/T	N/T	20	40	14
MPEG 40	30i NTSC 25i PAL	5	10	15	20	25	30	N/T	N/T	25	50	18
MPEG 50	30i NTSC 25i PAL	8	16	24	32	40	48	N/T	N/T	40	80	28

Legend

- White cells indicate 1 Gb connectivity required
- Shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- N/T indicates not tested

JFIF Progressive

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

Legend

- White cells indicate 1 Gb connectivity required
- Shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- N/T indicates not tested

JFIF Interlaced

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

Legend

- White cells indicate 1 Gb connectivity required
- Shaded cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- N/T indicates not tested

2K*

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/Hr
		1	2	3	4	5	6	7	8	4-WAY	9-WAY	
2K GEN*	2K/24 2048 X 1556	286	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	962
*Avid DS 11.x only												

1080i

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/Hr
		1	2	3	4	5	6	7	8	4-way	9-way	
RGB 10-bit *	1080i/59.94	240	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	864
1:1 10-bit HD	1080i/59.94	150	300	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	527
1:1 HD	1080i/59.94	125	250	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	439
RGB ProRes 4444	1080i/59.94	42	84	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	148
DNxHD 220 X	1080i/59.94	28	56	84	112	140	168	196	224	140	N/T	98
ProRes HQ	1080i/59.94	28	56	84	112	140	N/T	N/T	N/T	N/T	N/T	98
DNxHD 220	1080i/59.94	28	56	84	112	140	168	196	224	140	N/T	98
DNxHD 145	1080i/59.94	18.5	37	55.5	74	92.5	111	129.5	148	92.5	185	65
ProRes	1080i/59.94	18.5	37	55.5	74	N/T	N/T	N/T	N/T	N/T	N/T	65
DNxHD 100	1080i/59.94	14	28	42	56	70	84	N/T	N/T	70	N/T	46
J2k**	1080i/59.94	19*	38*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	66
ProRes LT	1080i/59.94	13	26	39	52	N/T	N/T	N/T	N/T	N/T	N/T	46
XDCAM 50	1080i/59.94	8	16	24*	32*	N/T	N/T	N/T	N/T	40	80	28
XDCAM 35	1080i/59.94	5	10	15	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM 25	1080i/59.94	3.5	7	10.5	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
XDCAM 17.5	1080i/59.94	2.5	5	7.5	N/T	N/T	N/T	N/T	N/T	12.5	N/T	9
DVCPRO HD	1080i/59.94	14.5	29	43.5	58	72.5	N/T	N/T	N/T	58	145	51
AVC-Intra 50	1080i/59.94	8	16	24*	32*	N/T	N/T	N/T	N/T	44	N/T	28
AVC-Intra 100	1080i/59.94	14	28	42*	56*	N/T	N/T	N/T	N/T	70*	N/T	50
XAVC 100	1080i/59.94	14	28	42*	56*	N/T	N/T	N/T	N/T	N/T	N/T	50
VC1-APL3	1080i/59.94	6	12	18	24	N/T	N/T	N/T	N/T	N/T	N/T	21
ProRes Proxy	1080i/59.94	5	10	15	20	25	N/T	N/T	N/T	N/T	N/T	18
H264 Proxy 800k	1080i/59.94	0.1	0.3	0.4	0.6	0.7	0.8	1	1.1	0.5	1	0.34
H264 Proxy 2 Mb	1080i/59.94	0.4	0.8	1.2	1.6	2	2.4	N/T	N/T	1	2	1.4
RGB 10-bit *	1080i 50	206	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	742
1:1 10-bit HD	1080i 50	131	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	461
1:1 HD	1080i 50	105	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	369
RGB ProRes 4444	1080i 50	36	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	127
DNxHD 185 X	1080i 50	23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/T	83
DNxHD 185	1080i 50	23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/T	83
ProRes HQ	1080i 50	23.5	47	70.5	94	N/T	N/T	N/T	N/T	N/T	N/T	56
DNxHD 120	1080i 50	16	32	48	64	80	96	112	128	80	N/T	56
ProRes	1080i 50	16	32	64	N/T	N/T	N/T	N/T	N/T	N/T	N/T	56
J2k**	1080i 50	16*	32*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	56
ProRes LT	1080i 50	11	22	33	44	55	N/T	N/T	N/T	N/T	N/T	39
DVCPRO HD	1080i 50	14.5	29	43.5	58	72.5	N/T	N/T	N/T	58	145	51
XDCAM 50	1080i 50	8	16	24*	32*	N/T	N/T	N/T	N/T	40	80	28
XDCAM 35	1080i 50	5	10	15	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM 25	1080i 50	3.5	7	10.5	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
XDCAM 17.5	1080i 50	2.5	5	7.5	N/T	N/T	N/T	N/T	N/T	12.5	N/T	9
AVC-Intra 50	1080i 50	8	16	24*	32*	N/T	N/T	N/T	N/T	44	N/T	28
AVC-Intra 100	1080i 50	14	28	42*	56*	N/T	N/T	N/T	N/T	70*	N/T	50
XAVC 100	1080i 50	14	28	42*	56*	N/T	N/T	N/T	N/T	N/T	N/T	50
VC1-APL3	1080i 50	6	12	18	24	N/T	N/T	N/T	N/T	N/T	N/T	21
ProRes Proxy	1080i 50	4	8	12	16	N/T	N/T	N/T	N/T	N/T	N/T	14
H264 Proxy	1080i 50	1	2	3	4	5	N/T	N/T	N/T	N/T	N/T	3.5

(*) Minimum Platform/Memory requirements must be met. 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
- Gray cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange cells indicate 10 Gb connectivity required.

- N/T indicates not tested

1080p

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/Hr
		1	2	3	4	5	6	7	8	4-way	9-way	
RGB 10-bit *	1080p/29.97	240	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	864
1:1 10-bit HD	1080p/29.97	150	300	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	527
1:1 HD	1080p/29.97	125	250	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	439
RGB DNxHD 444 440 X	1080p/29.97	55	110	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	194
RGB ProRes 4444	1080p/29.97	42	84	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	148
DNxHD 220 X	1080p/29.97	28	56	84	112	140	168	196	224	140	N/T	98
DNxHD 220	1080p/29.97	28	56	84	112	140	168	196	224	140	N/T	98
ProRes HQ	1080p/29.97	28	56	84	112	N/T	N/T	N/T	N/T	N/T	N/T	98
DNxHD 145	1080p/29.97	18.5	37	55.5	74	92.5	111	129.5	148	92.5	N/T	65
ProRes	1080p/29.97	18.5	37	55.5	74	N/T	N/T	N/T	N/T	N/T	N/T	65
DNxHD 100	1080p/29.97	14	28	42	56	70	84	N/T	N/T	70	N/T	46
J2k**	1080p/29.97	19*	38*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	67
ProRes LT	1080p/29.97	13	26	39	52	N/T	N/T	N/T	N/T	N/T	N/T	46
XDCAM50	1080p/29.97	8	16	24*	32*	N/T	N/T	N/T	N/T	40	N/T	28
XDCAM35	1080p/29.97	5	10	15	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM25	1080p/29.97	3.5	7	10.5	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
DNxHD 45	1080p/29.97	6	12	18	24	30	N/T	N/T	N/T	30	60	21
ProRes Proxy	1080p/29.97	5	10	15	20	25	30	N/T	N/T	N/T	N/T	18
RGB 10-bit *	1080p/25	206	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	742
1:1 10-bit HD	1080p/25	131	262	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	461
1:1 HD	1080p/25	105	210	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	373
RGB DNxHD 444 365 X	1080p/25	46	92	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	162
RGB ProRes 4444	1080p/25	36	72	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	127
DNxHD 185 X	1080p/25	23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/T	83
DNxHD 185	1080p/25	23.5	47	70.5	94	117.5	141	164.5	188	117.5	N/T	83
ProRes HQ	1080p/25	23.5	47	70.5	94	N/T	N/T	N/T	N/T	N/T	N/T	83
DNxHD 120	1080p/25	16	32	48	64	80	96	112	128	80	N/T	56
ProRes	1080p/25	16	32	48	64	N/T	N/T	N/T	N/T	N/T	N/T	56
J2k**	1080p/25	16*	32*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	56
ProRes LT	1080p/25	11	22	33	44	55	N/T	N/T	N/T	N/T	N/T	39
XDCAM50	1080p/25	8	16	N/T	N/T	N/T	N/T	N/T	N/T	40	N/T	28
XDCAM35	1080p/25	5	10	N/T	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM25	1080p/25	3.5	7	N/T	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
DNxHD 36	1080p/25	5	10	15	20	25	30	35	40	25	50	18
VC1-APL3	1080p/25	1	2	3	N/T	N/T	N/T	N/T	N/T	N/T	N/T	4
ProRes Proxy	1080p/25	4	8	12	16	20	24	N/T	N/T	N/T	N/T	14
RGB 10-bit *	1080p/24	196	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	706
1:1 10-bit HD	1080p/24	126	252	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	443
1:1 HD	1080p/24	101	202	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	355
RGB DNxHD 444 350 X	1080p/24	44	88	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	155
RGB ProRes 4444	1080p/24	35	70	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	123
DNxHD 175 X	1080p/24	23	46	69	92	115	138	161	184	115	N/T	81
DNxHD 175	1080p/24	23	46	69	92	115	138	161	184	115	N/T	81
ProRes HQ	1080p/24	23	46	69	92	N/T	N/T	N/T	N/T	N/T	N/T	81
DNxHD 115	1080p/24	15.5	31	46.5	62	77.5	93	108.5	124	77.5	N/T	54
ProRes	1080p/24	15.5	31	46.5	62	N/T	N/T	N/T	N/T	N/T	N/T	54
J2k**	1080p/24	15*	30*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	53
ProRes LT	1080p/24	10	20	30	40	50	N/T	N/T	N/T	N/T	N/T	35
DNxHD 36	1080p/24	5	10	15	20	25	30	35	40	25	50	18
H264 Proxy 800k	1080/p24	0.1	0.3	0.4	0.6	0.7	0.8	1	1.1	0.5	1	0.34
VC1-APL3	1080p/24	6	12	18	N/T	N/T	N/T	N/T	N/T	N/T	N/T	21
ProRes Proxy	1080p/24	4	8	12	16	20	N/T	N/T	N/T	N/T	N/T	14

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/Hr
		1	2	3	4	5	6	7	8	4-way	9-way	
RGB 10-bit *	1080p/23.976	196	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	706
1:1 10-bit HD	1080p/23.976	126	252	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	527
1:1 HD	1080p/23.976	101	202	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	355
RGB DNxHD 444 350 X	1080p/23.976	44	88	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	155
RGB ProRes 4444	1080p/23.976	35	70	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	123
DNxHD 175 X	1080p/23.976	23	46	69	92	115	138	161	184	115	N/T	81
DNxHD 175	1080p/23.976	23	46	69	92	115	138	161	184	115	N/T	81
ProRes HQ	1080p/23.976	23	46	69	92	N/T	N/T	N/T	N/T	N/T	N/T	81
DNxHD 115	1080p/23.976	15.5	31	46.5	62	77.5	93	108.5	124	77.5	155	54
ProRes	1080p/23.976	15.5	31	46.5	62	N/T	N/T	N/T	N/T	N/T	N/T	54
J2k**	1080p/23.976	15*	30*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	53
ProRes LT	1080p/23.976	9	18	27	36	N/T	N/T	N/T	N/T	N/T	N/T	32
XDCAM50	1080p23.976	7	14	21	28	35	42	49	56	25	N/T	25
XDCAM35	1080p/23.976	5	10	N/T	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM25	1080p/23.976	3.5	7	N/T	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
XDCAM17.5	1080p/23.976	2.5	5	N/T	N/T	N/T	N/T	N/T	N/T	12.5	N/T	9
DNxHD 36	1080p/23.976	5	10	15	20	25	30	35	40	25	50	18
AVC-Intra 50	1080p/23.976	8	16	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	28
AVC-Intra 100	1080p/23.976	14	28	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	50
VC1-APL3	1080p/23.976	6	12	18	N/T	N/T	N/T	N/T	N/T	N/T	N/T	21
ProRes Proxy	1080p/23.976	4	8	12	16	20	N/T	N/T	N/T	N/T	N/T	14

(*) Minimum Platform/Memory requirements must be met. 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
- Gray cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange cells indicate 10 Gb connectivity required.
- Yellow cells indicate resolutions available for 3D stereoscopic
- N/T indicates not tested

720p

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/Hr
		1	2	3	4	5	6	7	8	4-way	9-way	
1:1 10-bit HD	720p/59.94	142	284	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	499
1:1 HD	720p/59.94	106	210	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	373
DNxHD 220 X	720p/59.94	28	56	84	112	140	N/T	N/T	N/T	140	N/T	98
DNxHD 220	720p/59.94	28	56	84	112	140	N/T	N/T	N/T	140	N/T	98
ProRes HQ	720p/59.94	28	56	84	112	N/T	N/T	N/T	N/T	N/T	N/T	98
DNxHD 145	720p/59.94	18.5	37	55.5	74	92.5	N/T	N/T	N/T	92.5	N/T	65
ProRes	720p/59.94	18.5	37	55.5	74	N/T	N/T	N/T	N/T	N/T	N/T	65
DNxHD 100	720p/59.94	14	28	42	56	70	84	N/T	N/T	70	150	67
J2k**	720p/59.94	19*	38*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	46
ProRes LT	720p/59.94	13	26	39	52	N/T	N/T	N/T	N/T	N/T	N/T	46
XDCAM50	720p/59.94	8	16	24*	32*	N/T	N/T	N/T	N/T	40	N/T	28
XDCAM35	720p/59.94	5	10	15	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM25	720p/59.94	3.5	7	10.5	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
DVCPRO HD	720p/59.94	14.5	29	43.5	N/T	N/T	N/T	N/T	N/T	72.5	145	51
AVC-Intra 50	720p/59.94	8	16	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	28
AVC-Intra 100	720p/59.94	14	28	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	50
ProRes Proxy	720p/59.94	5	10	15	20	25	N/T	N/T	N/T	N/T	N/T	18
H264 Proxy	720p/59.94	1	2	3	4	5	N/T	N/T	N/T	N/T	N/T	3.5
H264 Proxy 800k	720p/59.94	0.1	0.3	0.4	0.6	0.7	0.8	1	1.1	0.5	1	0.34
H264 Proxy 2 Mb	720p/59.94	0.4	0.8	1.2	1.6	2	2.4	N/T	N/T	1	2	1.4
1:1 10-bit HD	720p/50	120	240	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	422

Resolution	Project Format	Number of Streams per client (MB/s)								Multi-cam (MB/s)		GB/Hr
		1	2	3	4	5	6	7	8	4-way	9-way	
1:1 HD	720p/50	89	178	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	313
DNxHD 185 X	720p/50	23.5	47	70.5	94	117.5	N/T	N/T	N/T	117.5	N/T	83
DNxHD 185	720p/50	23.5	47	70.5	94	117.5	N/T	N/T	N/T	117.5	N/T	83
ProRes HQ	720p/50	23.5	47	70.5	94	N/T	N/T	N/T	N/T	N/T	N/T	83
DNxHD 120	720p/50	16	32	48	64	80	N/T	N/T	N/T	75	150	53
ProRes	720p/50	15	30	45	64	N/T	N/T	N/T	N/T	N/T	N/T	53
J2k**	720p/50	16*	32*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	57
ProRes LT	720p/50	11	22	33	44	N/T	N/T	N/T	N/T	N/T	N/T	39
XDCAM50	720p/50	8	16	24*	32*	N/T	N/T	N/T	N/T	40	N/T	28
XDCAM35	720p/50	5	10	N/T	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM25	720p/50	3.5	7	N/T	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
DVCPRO HD	720p/50	8	16	N/T	N/T	N/T	N/T	N/T	N/T	40	N/T	28
AVC-Intra 50	720p/50	8	16	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	28
AVC-Intra 100	720p/50	14	28	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	50
ProRes Proxy	720p/50	4	8	12	16	20	24	N/T	N/T	N/T	N/T	14
H264 Proxy	720p/50	1	2	3	4	5	N/T	N/T	N/T	N/T	N/T	3.5
1:1 10-bit HD	720p/29.97	71	142	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	250
1:1 HD	720p/29.97	53	106	159	N/T	N/T	N/T	N/T	N/T	N/T	N/T	186
DNxHD 220 X	720p/29.97	28	56	84	112	140	N/T	N/T	N/T	140	N/T	98
DNxHD 220	720p/29.97	28	56	84	112	140	N/T	N/T	N/T	140	N/T	98
ProRes HQ	720p/29.97	28	56	84	112	N/T	N/T	N/T	N/T	N/T	N/T	98
DNxHD 145	720p/29.97	18.5	37	55.5	74	92.5	N/T	N/T	N/T	92.5	N/T	65
ProRes	720p/29.97	18.5	37	55.5	74	N/T	N/T	N/T	N/T	N/T	N/T	65
DNxHD 110	720p/29.97	14	28	42	56	70	84	N/T	N/T	N/T	N/T	50
J2k**	720p/29.97	10*	20*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	36
ProRes LT	720p/29.97	13	26	39	52	N/T	N/T	N/T	N/T	N/T	N/T	46
DVCPRO HD	720p/29.97	14.5	29	43.5	N/T	N/T	N/T	N/T	N/T	72.5	145	51
1:1 10-bit HD	720p/25	60	120	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	211
1:1 HD	720p/25	48	96	144	N/T	N/T	N/T	N/T	N/T	N/T	N/T	169
DNxHD 90 X	720p/25	12	24	36	48	60	N/T	N/T	N/T	60	120	42
DNxHD 90	720p/25	12	24	36	48	60	N/T	N/T	N/T	60	120	42
ProRes HQ	720p/25	12	24	36	48	N/T	N/T	N/T	N/T	N/T	N/T	42
DNxHD 60	720p/25	8	16	24	32	40	N/T	N/T	N/T	40	80	28
ProRes	720p/25	8	16	24	32	N/T	N/T	N/T	N/T	N/T	N/T	28
J2k**	720p/25	9*	18*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	32
ProRes LT	720p/25	7	14	21	28	N/T	N/T	N/T	N/T	N/T	N/T	25
XDCAM35	720p/25	5	10	15	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM25	720p/25	3.5	7	10.5	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
AVC-Intra 50	720p/25	8	16	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	28
AVC-Intra 100	720p/25	14	28	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	50
1:1 10-bit HD	720p/23.976	58	116	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	204
1:1 HD	720p/23.976	46	92	138	N/T	N/T	N/T	N/T	N/T	N/T	N/T	162
DNxHD 90 X	720p/23.976	11.5	24	35.5	46	57.5	N/T	N/T	N/T	57.5	115	40
DNxHD 90	720p/23.976	11.5	24	35.5	46	57.5	N/T	N/T	N/T	57.5	115	40
ProRes HQ	720p/23.976	11.5	24	35.5	46	N/T	N/T	N/T	N/T	N/T	N/T	40
DNxHD 60	720p/23.976	7.5	16	22.5	30	37.5	N/T	N/T	N/T	37.5	75	26
ProRes	720p/23.976	7.5	16	22.5	30	N/T	N/T	N/T	N/T	N/T	N/T	26
J2k**	720p/23.976	8*	16*	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	29
ProRes LT	720p/23.976	6.5	13	19.5	26	N/T	N/T	N/T	N/T	N/T	N/T	23
XDCAM35	720p/23.976	5	10	N/T	N/T	N/T	N/T	N/T	N/T	25	N/T	18
XDCAM25	720p/23.976	3.5	7	N/T	N/T	N/T	N/T	N/T	N/T	17.5	N/T	13
DVCPRO HD	720p/23.976	14.5	29	43.5	N/T	N/T	N/T	N/T	N/T	72.5	145	51
AVC-Intra 50	720p/23.976	8	16	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	28
AVC-Intra 100	720p/23.976	14	28	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	50
ProRes Proxy	720p/23.976	4	8	12	16	20	N/T	N/T	N/T	N/T	N/T	14

(*) Minimum Platform/Memory requirements must be met. 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
- Gray cells indicate Dual 1 Gb (2 Gb) or 10 Gb connectivity required
- Orange cells indicate 10 Gb connectivity required.
- N/T indicates not tested

2K with Media Composer v8.3 or later

Resolution	Project Format	Bandwidth per stream	GB/Hr
• Gray cells indicate 2 X 1 Gb or 10 Gb connectivity required. UHRC resolutions are not supported during redistribution • Orange cells indicate 10 Gb, UHRC client type connection required.			
DNxHR 4:4:4	2048x1080/23.976	44	156
DNxHR High Quality (10 bit)	2048x1080/23.976	23	79
DNxHR High Quality (8 bit)	2048x1080/23.976	23	79
DNxHR Standard Quality	2048x1080/23.976	15	53
DNxHR Low Bandwidth	2048x1080/23.976	4	15
DNxHR 4:4:4	2048x1080/24	44	156
DNxHR High Quality (10 bit)	2048x1080/24	23	79
DNxHR High Quality (8 bit)	2048x1080/24	23	79
DNxHR Standard Quality	2048x1080/24	15	53
DNxHR Low Bandwidth	2048x1080/24	4	15
DNxHR 4:4:4	2048x1080/25	46	163
DNxHR High Quality (10 bit)	2048x1080/25	23	81
DNxHR High Quality (8 bit)	2048x1080/25	23	81
DNxHR Standard Quality	2048x1080/25	15	54
DNxHR Low Bandwidth	2048x1080/25	5	18
DNxHR 4:4:4	2048x1080/29.97	55	195
DNxHR High Quality (10 bit)	2048x1080/29.97	28	97
DNxHR High Quality (8 bit)	2048x1080/29.97	28	97
DNxHR Standard Quality	2048x1080/29.97	18	65
DNxHR Low Bandwidth	2048x1080/29.97	6	20
DNxHR 4:4:4	2048x1080/48	89	312
DNxHR High Quality (10 bit)	2048x1080/48	45	156
DNxHR High Quality (8 bit)	2048x1080/48	45	156
DNxHR Standard Quality	2048x1080/48	30	104
DNxHR Low Bandwidth	2048x1080/48	9	33
DNxHR 4:4:4	2048x1080/50	93	325
DNxHR High Quality (10 bit)	2048x1080/50	46	163
DNxHR High Quality (8 bit)	2048x1080/50	46	163
DNxHR Standard Quality	2048x1080/50	31	108
DNxHR Low Bandwidth	2048x1080/50	10	34
DNxHR 4:4:4	2048x1080/59.94	111	390

Resolution	Project Format	Bandwidth per stream	GB/Hr
• Gray cells indicate 2 X 1 Gb or 10 Gb connectivity required. UHRC resolutions are not supported during redistribution • Orange cells indicate 10 Gb, UHRC client type connection required.			
DNxHR High Quality (10 bit)	2048x1080/59.94	56	195
DNxHR High Quality (8 bit)	2048x1080/59.94	56	195
DNxHR Standard Quality	2048x1080/59.94	37	130
DNxHR Low Bandwidth	2048x1080/59.94	12	40

UHD with Media Composer v8.3 or later

Resolution	Project Format	Bandwidth per stream	GB/Hr
• Gray cells indicate 2 X 1 Gb or 10 Gb connectivity required. UHRC resolutions are not supported during redistribution • Orange cells indicate 10 Gb, UHRC client type connection required.			
DNxHR 4:4:4	3840x2160/23.976	168	591
DNxHR High Quality (10 bit)	3840x2160/23.976	89	313
DNxHR High Quality (8 bit)	3840x2160/23.976	89	313
DNxHR Standard Quality	3840x2160/23.976	56	197
DNxHR Low Bandwidth	3840x2160/23.976	18	63
XAVC-Intra (MC v8.3.1 or later)	3840x2160/23.976	30	105
DNxHR 4:4:4	3840x2160/24	168	591
DNxHR High Quality (10 bit)	3840x2160/24	89	313
DNxHR High Quality (8 bit)	3840x2160/24	89	313
DNxHR Standard Quality	3840x2160/24	56	197
DNxHR Low Bandwidth	3840x2160/24	18	63
DNxHR 4:4:4	3840x2160/25	175	615
DNxHR High Quality (10 bit)	3840x2160/25	88	309
DNxHR High Quality (8 bit)	3840x2160/25	88	309
DNxHR Standard Quality	3840x2160/25	58	204
DNxHR Low Bandwidth	3840x2160/25	18	63
DNxHR 4:4:4	3840x2160/29.97	210	738
DNxHR High Quality (10 bit)	3840x2160/29.97	105	369
DNxHR High Quality (8 bit)	3840x2160/29.97	105	369
DNxHR Standard Quality	3840x2160/29.97	70	246
DNxHR Low Bandwidth	3840x2160/29.97	22	77
XAVC-Intra (MC v8.3.1 or later)	3840x2160/29.97	36	127
DNxHR 4:4:4	3840x2160/48	334	1173
DNxHR High Quality (10 bit)	3840x2160/48	167	586
DNxHR High Quality (8 bit)	3840x2160/48	167	586
DNxHR Standard Quality	3840x2160/48	110	388
DNxHR Low Bandwidth	3840x2160/48	34	121
DNxHR 4:4:4	3840x2160/50	350	1230
DNxHR High Quality (10 bit)	3840x2160/50	175	615

Resolution	Project Format	Bandwidth per stream	GB/Hr
• Gray cells indicate 2 X 1 Gb or 10 Gb connectivity required. UHRC resolutions are not supported during redistribution • Orange cells indicate 10 Gb, UHRC client type connection required.			
DNxHR High Quality (8 bit)	3840x2160/50	175	615
DNxHR Standard Quality	3840x2160/50	115	404
DNxHR Low Bandwidth	3840x2160/50	37	130
DNxHR 4:4:4	3840x2160/59.94	N/T	N/T
DNxHR High Quality (10 bit)	3840x2160/59.94	209	735
DNxHR High Quality (8 bit)	3840x2160/59.94	209	735
DNxHR Standard Quality	3840x2160/59.94	138	485
DNxHR Low Bandwidth	3840x2160/59.94	44	155
XAVC-Intra (MC v8.3.1 or later)	3840x2160/59.94	72	253

4K with Media Composer v8.3 or later

Resolution	Project Format	Bandwidth per stream	GB/Hr
• Gray cells indicate 2 X 1 Gb or 10 Gb connectivity required. UHRC resolutions are not supported during redistribution • Orange cells indicate 10 Gb, UHRC client type connection required.			
DNxHR 4:4:4	4096x2160/23.976	185	650
DNxHR High Quality (10 bit)	4096x2160/23.976	90	316
DNxHR High Quality (8 bit)	4096x2160/23.976	90	316
DNxHR Standard Quality	4096x2160/23.976	59	207
DNxHR Low Bandwidth	4096x2160/23.976	18	63
XAVC-Intra (MC v8.3.1 or later)	4096x2160/23.976	29	102
DNxHR 4:4:4	4096x2160/24	185	650
DNxHR High Quality (10 bit)	4096x2160/24	90	316
DNxHR High Quality (8 bit)	4096x2160/24	90	316
DNxHR Standard Quality	4096x2160/24	59	207
DNxHR Low Bandwidth	4096x2160/24	18	63
XAVC-Intra (MC v8.3.1 or later)	4096x2160/24	29	102
DNxHR 4:4:4	4096x2160/25	187	657
DNxHR High Quality (10 bit)	4096x2160/25	94	330
DNxHR High Quality (8 bit)	4096x2160/25	94	330
DNxHR Standard Quality	4096x2160/25	62	218
DNxHR Low Bandwidth	4096x2160/25	20	70
XAVC-Intra (MC v8.3.1 or later)	4096x2160/25	29	102
DNxHR 4:4:4	4096x2160/29.97	222	780
DNxHR High Quality (10 bit)	4096x2160/29.97	112	394
DNxHR High Quality (8 bit)	4096x2160/29.97	112	394
DNxHR Standard Quality	4096x2160/29.97	74	260
DNxHR Low Bandwidth	4096x2160/29.97	24	84
XAVC-Intra (MC v8.3.1 or later)	4096x2160/29.97	36	127

Resolution	Project Format	Bandwidth per stream	GB/Hr
• Gray cells indicate 2 X 1 Gb or 10 Gb connectivity required. UHRC resolutions are not supported during redistribution • Orange cells indicate 10 Gb, UHRC client type connection required.			
DNxHR 4:4:4	4096x2160/48	356	1251
DNxHR High Quality (10 bit)	4096x2160/48	178	626
DNxHR High Quality (8 bit)	4096x2160/48	178	626
DNxHR Standard Quality	4096x2160/48	118	414
DNxHR Low Bandwidth	4096x2160/48	37	129
DNxHR 4:4:4	4096x2160/50	370	1301
DNxHR High Quality (10 bit)	4096x2160/50	188	661
DNxHR High Quality (8 bit)	4096x2160/50	188	661
DNxHR Standard Quality	4096x2160/50	125	439
DNxHR Low Bandwidth	4096x2160/50	39	137
XAVC-Intra (MC v8.3.1 or later)	4096x2160/50	56	197
DNxHR 4:4:4	4096x2160/59.94	N/T	N/T
DNxHR High Quality (10 bit)	4096x2160/59.94	224	788
DNxHR High Quality (8 bit)	4096x2160/59.94	224	788
DNxHR Standard Quality	4096x2160/59.94	150	527
DNxHR Low Bandwidth	4096x2160/59.94	46	162
XAVC-Intra (MC v8.3.1 or later)	4096x2160/59.94	72	253

11.4 Tested Stream Counts with Avid Non-Editor Ingest Devices

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

Resolution	Device	Number of Streams per client (MB/s)				GB/Hr 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/T	N/T	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/T	N/T	36
IMX30	AirSpeed 5000	10	20	N/T	N/T	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
IMX50	AirSpeed Multi Steam	10	20	N/T	N/T	36
IMX30	AirSpeed Multi Steam	10	20	N/T	N/T	22
DV 25	AirSpeed Classic	10	20	N/T	N/T	22
DV 50	AirSpeed Classic	10	20	N/T	N/T	36
IMX50	AirSpeed Classic	10	20	N/T	N/T	36
IMX30	AirSpeed Classic	10	20	N/T	N/T	22
DNxHD 115	AirSpeed Classic	18	N/T	N/T	N/T	64
DNxHD 120	AirSpeed Classic	18	N/T	N/T	N/T	64
DNxHD 145	AirSpeed Classic	22	N/T	N/T	N/T	78
SD 1:1	AirSpeed Classic	25	N/T	N/T	N/T	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/T	N/T	72
DNxHD 220	AirSpeed Multi Steam	30	N/T	N/T	N/T	108
H264	AirSpeed Multi Steam	1	2	3	4	3.5

Legend

- N/T indicates not tested
- Bandwidth limiting may be required to achieve the above ratings

11.5 Tested Stream Counts with Avid Non-Editor Playback Devices

The following chart outlines the tested stream counts for each playback device. The bandwidth displayed is the suggested bandwidth limit setting by resolution to 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
DNxHD100	AirSpeed 5000	14	28	42	56
DNxHD145/120	AirSpeed 5000	20	40	60	80
DNxHD220/185	AirSpeed 5000	30	60	N/T	N/T
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/T	N/T
DNxHD 220	AirSpeed Multi Steam	30	N/T	N/T	N/T
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
IMX30	AirSpeed Classic	6	12	N/A	N/A
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/T indicates not tested
- Bandwidth limiting may be required to achieve the above ratings
- When playing two tracks of compressed audio with H.264 media please budget 1.8 MB/sec. of bandwidth

12.0 Pro Tools Performance

The ISIS 4.7 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.force.com/pkb/articles/en_US/Compatibility/en371639

13.0 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 *ICSHow to Buy Hardware Guide* that corresponds with your ICS version, available on the Avid Knowledge Base.

The following stream counts are tested 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
AVC Intra 100, DNxHD 145, 45; DVCPRO-HD	N/T	16 (12)	N/T	16 (12)	N/T	16 (12)
AVC Intra 100	N/T	10	N/T	10	N/T	10
XDCAMHD 50, DNxHD 45	12	24 (15)	12	24 (15)	12	24 (15)
AVC intra 50	10 (8)	10 (8)	10 (8)	10 (8)	10 (8)	10 (8)
XDCAM EX 35, IMX50	16	42 (34)	16	36 (30)	16	42 (34)
XDCAM HD 35/17.5	18	36 (24)	18	30 (20)	18	36 (24)
DV50	12	56 (36)	12	52 (32)	12	50 (36)
DV 25; IMX 30/40	20	42 (40)	20	42 (40)	20	42 (40)
Proxy (h.264 - 2 Mbps)	80 (70)	80 (70)	40 (32)	40 (32)	N/T	N/T
Proxy (h.264 - 800 Kbps)	120 (100)	120 (100)	60 (50)	60 (50)	N/T	N/T
Proxy /h.263	80	80 (80)	30 (24)	30 (24)	N/T	N/T

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

14.0 Adding a Single or Multiple Engines to a Storage Group

ISIS 4.7 introduces the Redistribution Monitor feature, accessed via the Tools menu in the Management Console. This feature displays the overall progress of the redistribution as well as the aggregate rate at which the data is moving. Additionally, you can monitor the progress of individual Storage Managers. ISIS 4.7 users should refer to the Redistribution Monitor to determine the completion time for a given redistribution. The redistribution results in section 13 of this document are based on tests using the 4.6 software and cover up to 6 engines. However, the results will be close to what is expected in 4.7 for up to 6 engines and can be used as a reference.

Use the tables below to determine the amount of time expected 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 were present in the original Storage Group. Note that UHRC resolutions are not supported during redistribution operations.

The numbers provided in this section are based on a healthy system, and might vary by as much as 35% longer. If your system exhibits any unexpected failures or issues, these numbers may vary more.

Estimated Time to Completion with no Bandwidth (Hours)

# of engines	Capacity Filled / Time to Completion		
	30%	60%	90%
1-2 Engines 2 TB drives	5	6	9
2-3 Engines 2 TB drives	5.5	11	18
3-4 Engines 2 TB drives	7	15	23
4-5 Engines 2 TB drives	8	17	24
5-6 Engines 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
All Read	175	350	525	700	875
50% Mixed Load	150	300	450	600	750
All Write	100	200	300	400	500

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

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

15.0 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
All Read	175	350	525	700	875
50% Mixed Load	150	300	450	600	750
All Write	100	200	300	400	500

16.0 Moving a Workspace Between Storage Groups

Avid supports up to 50% client load against each of the Storage Groups taking part in a workspace move. The table below outlines the engine ratings by configuration. In general, when moving a workspace between storage groups, each engine that is the source storage group will send data at a rate of about 140 MB/sec on average per engine.

17.0 Editor Hardware and Software Used During Testing

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

Platform	OS	CPU	Memory	Editor Version	ISIS Client
HP z840	Windows 7 64-bit	Dual 8 core 2.6 GHz Intel Xeon E5-2640 v3	64 GB	Media Composer 8.4	V4.7.6
HP z440	Windows 7 64-bit	8 core 3.0 GHz Intel Xeon E5-1660 v3	16 GB	Media Composer 8.4	V4.7.6
Dell 7910	Windows 7 64-bit	Dual 10 Core 2.6 GHz Intel Xeon E5-2650	32 GB	Media Composer 8.4	V4.7.6
HP z820	Windows 8/8.1 64-bit Windows 7 64-bit SP1	8 Core 2.6 GHz Intel Xeon Gen2	16 GB	Media Composer 8.4 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
HP z820	Windows 8/8.1 64-bit Windows 7 64-bit SP1	8 Core 2.7 GHz Intel Xeon	16 GB	Media Composer 8.4 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
Lenovo C30	Windows 8/8.1 64-bit Windows 7 64-bit SP1	8 Core 2.2 GHz Intel Xeon	16 GB	Media Composer 8.4 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
HP z800	Windows 8/8.1 64-bit Windows 7 64-bit SP1	6 Core 2.67GHz Intel Xeon	12 GB	Media Composer 8.0 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
HP z820	Red Hat Linux 6.2/6.3	8 Core 2.7 GHz Intel Xeon	16 GB	N/A	V4.7.6
HP z420	Windows 8/8.1 64-bit Windows 7 64-bit SP1	6 Core 3.20 GHz Intel Xeon	8 GB	Media Composer 8.0 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
Lenovo S30	Windows 8/8.1 64-bit Windows 7 64-bit SP1	6 Core 3.20 GHz Intel Xeon	16 GB	Media Composer 8.0 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
HP z400	Windows 8/8.1 64-bit Windows 7 64-bit SP1	6 Core 3.33GHz Intel Xeon	12 GB	Media Composer 8.0 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
HP Z230*	Windows 8/8.1 64-bit Windows 7 64-bit SP1	4 Core E3-1245 v3 3.40 GHz Intel Xeon	8 GB	Media Composer 8.0 Media Composer 7.0.3	V4.7.6
Dell T-1700*	Windows 8/8.1 64-bit	4 Core E3-1245 v3 3.40 GHz Intel Xeon	8 GB	Media Composer 7.0.3	V4.7.6
Lenovo E32*	Windows 8/8.1 64-bit	4 Core E3-1245 v3 3.40 GHz Intel Xeon	8 GB	Media Composer 7.0.3	V4.7.6
HP Z220	Windows 7 64-bit SP1	4 Core E3-1245 3.40 GHz Intel Xeon	8 GB	Media Composer 8.0 Media Composer 7.0.3 Media Composer 6.5	V4.7.6
HP Z210	Windows 7 64-bit SP1	4 Core E31270 3.40 GHz Intel Xeon	4 GB	Media Composer 6.5	V4.7.6
HP 8570w	Windows 7 64-bit SP1	i7-3820QM 2.7 GHz	8 GB	Media Composer 7.0 Media Composer 6.5	V4.7.6
HP 8760w	Windows 7 64-bit SP1	4 Core 2.3 GHz Intel i7	4 GB	Media Composer 6.5	V4.7.6
Dell M6600	Windows 7 64-bit SP1	4 Core 2.20 GHz Intel i7	4 GB	Media Composer 6.5	V4.7.4
Mac Pro cylinder with Sonnet exp.	10.9 – 10.10	8 Core 3 GHz Intel Xeon E5	16 GB	Media Composer 8.4	V4.7.6
Mac Pro (Westmere)	10.7.4 – 10.9	2 X 2.6 GHz 6 Core Intel Xeon	12 GB	Media Composer 7.0 Media Composer 6.5	V4.7.6
Mac Pro (Westmere)	10.7.4 – 10.9	2 X 2.4 GHz Quad Core Intel Xeon	6 GB	Media Composer 7.0 Media Composer 6.5	V4.7.6
MacBook Pro 15"	10.7.4 – 10.9	2.3/2.6/2.7 GHz I7 quad core Retina & Thunderbolt	8 GB	Media Composer 6.5	V4.7.6
Mac Pro (Nehalem)	10.7.4 – 10.9	2 x 2.66 GHz Dual-Core Intel Xeon	6 GB	Media Composer 7.0 Media Composer 6.5	V4.7.6

Platform	OS	CPU	Memory	Editor Version	ISIS Client
iMac	10.7.4 – 10.9	3.6 GHz Intel Core i5	6 GB	Media Composer 7.0.3 Media Composer 6.5	V4.7.6

* Platform requires the Intel 18.3 driver family or later. The 18.3 kit is not included with the ISIS 4.5 release, but is available at Avid's Download Center. For 4.7, the 18.6 kit is included.

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

18.0 Tested Stream Counts with Apple Final Cut Pro Editors

See Section 11.1 of this document for support of 2K/4K/5K formats/codecs while using Final Cut Pro X. Avid has tested Final Cut Pro X as a client in the Avid ISIS 5000 shared storage environment. For supported versions, see the *Avid ISIS ReadMe*. There is no Avid restriction on the QuickTime version. Use the QuickTime version recommended in the Final Cut Pro X application. 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.

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 list characterizes the setup guidelines used with Final Cut Pro X clients on Avid ISIS 5000.

- Follow the general client parameters specified for all Avid ISIS Macintosh clients.
- For Final Cut Pro X versions 10.2.1 and later, Libraries and Media can be stored on ISIS. For FCP X 10.1.2 - 10.1.4, it is recommended that you create and store libraries on the client's local hard drives, and store the media files and cache on the ISIS system. You can modify the Library Storage location settings in the Library Properties menu.
- Final Cut Pro X editing software was characterized with the AJA KONA™3 hardware.
- 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 X storage group as well as an environment with Final Cut Pro X and Avid editors used in the same storage group. Scaling an Avid ISIS 5000 beyond a single engine effectively scales in a linear fashion based on a single engine's performance.

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

Avid ISIS shared storage and Avid editors are tuned to read and write optimal patterns to ISIS storage. Avid cannot control the read/write patterns of 3rd party editors (such as Final Cut Pro X). These editors often issue multiple small reads that require additional processing and seek operations that affect the performance of all the attached editors (Avid and 3rd party). Therefore the overall performance of ISIS is affected when mixing Avid and non-Avid editors.

Final Cut Pro Only

# of Engines	All Reads	All Writes	Aggregate
Available B/W per engine	250 MB/s	200 MB/s	250 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 X 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/Hr
		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
- N/T indicates not tested

720p

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
ProRes NQ 59	720p/23.98	9	18	27	36	45	54	32
ProRes HQ 88	720p/23.98	12	24	36	48	60	N/T	42
ProRes Proxy 19	720p/25	3	6	9	12	15	18	11
ProRes NQ 61	720p/25	9	18	27	36	45	54	31
ProRes HQ 92	720p/25	13	26	39	52	65	78	46
ProRes NQ 73	720p/29.97	11	22	33	44	55	66	38
ProRes HQ 110	720p/29.97	15	30	45	60	75	90	53
ProRes Proxy 38	720p/50	6	12	18	24	30	36	21
ProRes NQ 122	720p/50	16	32	48	64	80	96	57
ProRes HQ 184	720p/50	24	48	72	96	N/T	N/T	84
ProRes NQ 147	720p/59.94	20	40	N/T	N/T	N/T	N/T	70
ProRes HQ 220	720p/59.94	29	58	N/T	N/T	N/T	N/T	102

Legend

- White cells indicate 1 Gb connectivity required
- Shaded cells indicate Dual 1 Gb (2 Gb) connectivity required
- N/T indicates not tested

1080i

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
1:1 10 bit	1080i/59.94	150	N/T	N/T	N/T	N/T	N/T	527
1:1 8 bit	1080i/59.94	125	N/T	N/T	N/T	N/T	N/T	439
XDCAM 50	1080i/59.94	8	16	24*	32*	N/T	N/T	28
ProRes NQ 117	1080i/23.98	16	32	48	64	N/T	N/T	56
ProRes HQ 176	1080i/23.98	23	46	69	N/T	N/T	N/T	81
ProRes Proxy 38	1080i/25	6	12	18	24	30	36	21
ProRes NQ 122	1080i/25	16	32	48	64	80	96	57
ProRes HQ 184	1080i/25	24	48	72	96	N/T	N/T	84
ProRes Proxy 45	1080i/29.97	7	14	21	28	35	42	24
ProRes NQ 147	1080i/29.97	20	40	60	N/T	N/T	N/T	70
ProRes HQ 220	1080i/29.97	29	58	N/T	N/T	N/T	N/T	102

Legend

- N/T indicates not tested
- White cells indicate 1 Gb connectivity required
- Gray cells indicate Dual 1 Gb (2 Gb) connectivity required
- Orange cells indicate 10 Gb connectivity required

PAL / NTSC

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

Legend

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

Uncompressed

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
Uncompressed 8bit 4:2:2 SD	525i 23.98	23	45	64	84	101	118	81
Uncompressed 8bit 4:2:2 SD	625i 25	23	46	65	86	108	130	81
Uncompressed 8bit 4:2:2 SD	525i 29.97	25	52	78	102	122	N/T	88
Uncompressed 8bit 4:2:2 HD	1280x720p 23.98	49	95	N/T	N/T	N/T	N/T	172
Uncompressed 8bit 4:2:2 HD	1280x720p 25	50	96	N/T	N/T	N/T	N/T	176
Uncompressed 8bit 4:2:2 HD	1280x720p 29.97	57	112	N/T	N/T	N/T	N/T	200
Uncompressed 8bit 4:2:2 HD	1280x720p 50	92	N/T	N/T	N/T	N/T	N/T	323
Uncompressed 8bit 4:2:2 HD	1280x720p 59.94	112	N/T	N/T	N/T	N/T	N/T	394
Uncompressed 8bit 4:2:2 HD	1920x1080p 23.98	103	N/T	N/T	N/T	N/T	N/T	362
Uncompressed 8bit 4:2:2 HD	1920x1080p 25	104	N/T	N/T	N/T	N/T	N/T	366
Uncompressed 8bit 4:2:2 HD	1920x1080p 29.97	124	N/T	N/T	N/T	N/T	N/T	436
Uncompressed 8bit 4:2:2 HD	1920x1080i 50	104	N/T	N/T	N/T	N/T	N/T	366
Uncompressed 8bit 4:2:2 HD	1920x1080i 60	124	N/T	N/T	N/T	N/T	N/T	436
Uncompressed 10bit 4:2:2 SD	525i 23.98	25	48	71	94	117	N/T	88
Uncompressed 10bit 4:2:2 SD	625i 25	31	59	87	116	N/T	N/T	109
Uncompressed 10bit 4:2:2 SD	525i 29.97	30	58	88	115	N/T	N/T	105
Uncompressed 10bit 4:2:2 SD	1280x720p 23.98	64	N/T	N/T	N/T	N/T	N/T	225
Uncompressed 10bit 4:2:2 SD	1280x720p 25	65	N/T	N/T	N/T	N/T	N/T	229
Uncompressed 10bit 4:2:2 SD	1280x720p 29.97	76	N/T	N/T	N/T	N/T	N/T	267

Legend

- N/T indicates not tested
- White cells indicate 1 Gb connectivity required
- Gray cells indicate Dual 1 Gb (2 Gb) connectivity required
- Orange cells indicate 10 Gb connectivity required

18.2 Final Cut Pro Editor Hardware and Software Used During Testing

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

Platform	OS	CPU	Memory	Editor Version	ISIS Client
Mac Pro	10.9.x	2 x 2.66GHz Quad-Core Intel Xeon (Nehalem)	16GB	Media Composer v7.0.x Media Composer v8.x	v4.7.4
Mac Pro	10.9.x	2 x 2.4 GHz Quad-Core Intel Xeon Mid 2010	16GB	Final Cut Pro X	v4.7.4
Mac Pro	10.9.x	2 x 2.66GHz Quad-Core Intel Xeon (Nehalem)	16GB	Media Composer v7.0.x Media Composer v8.x	v4.7.4
Mac Pro	10.9.x	2 x 2.26 GHz Quad-Core Intel Xeon Early 2009	16GB	Final Cut Pro X	v4.7.4
HP Z400	Windows 8	6 Core 3.07 GHz Intel Xeon	12GB	Media Composer v7.0.x	v4.7.4

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

See Section 11.1 of this document for support of 2K/4K/5K formats/codecs while using Adobe Premiere Pro CC v8. Avid has tested Adobe Premiere Pro CC v8 as a client in the Avid ISIS 5000 shared storage environment, using Adobe Premiere Pro CC v8, Media Composer v7.0 and v8.0, with an Avid ISIS v4.7 client in an ISIS v4.7 infrastructure.

The following are guidelines used with Adobe Premiere clients on Avid ISIS 5000.

- Adobe Premiere 10 Gb clients are now supported on ISIS 5000.
- Media from both Adobe Premiere and Avid Media Composer are able to co-exist in the same storage group. For optimal performance you should not mix Avid editors and Premiere editors in the same Storage Group.
- Adobe Premiere CC was qualified on Windows 7 and 8 64-bit and Mac OS v10.9.x and 10.10.x 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 in an all Adobe Premiere storage group as well as an environment with Adobe Premiere and Avid editors used 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 engine's performance.

Adobe Premiere Only

# of Engines	All Reads	All Writes	Aggregate
Available B/W per Engine	300 MB/s AVC intra is 130 MB/s	200 MB/s	300 MB/s

Adobe Premiere and Avid Editors in a Mixed Environment

# of Engines	All Reads	All Writes	Aggregate
Available B/W per engine	300 MB/s • When you have Adobe and Avid clients, better performance is expected if you have more Avid clients than Adobe clients. • Engine ratings are better with some DVC PRO resolutions. Some AVC resolutions can cause the Engine rating to fall below the expected rate.	200 MB/s	300 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 Creative Cloud v8 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.

DVC Pro SD (Windows x64 and Mac OS 10.8.5/10.9.x)

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

720p (Windows 7/8 x64 and Mac OS 10.8.5/10.9.x)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		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	N/T	59.8
DVCPROHD 960*720 59.94	720p/60	18	35	52	69	86	N/T	59.8

Legend

- N/T indicates not tested
- Gray cells indicate 2 X 1 Gb

720p (Mac OS 10.8.5/10.9.x)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
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/T	N/T	N/T	35.2
AVC-Intra 50 960*720 59.94	720p/60	9	19	N/T	N/T	N/T	N/T	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/T	35.2
AVC-Intra 100 1280*720 29.97	720p/30	10	20	28	45	53	N/T	35.2
AVC-Intra 100 1280*720 50	720p/50	20	41	N/T	N/T	N/T	N/T	59.8
AVC-Intra 100 1280*720 59.94	720p/60	18	38	N/T	N/T	N/T	N/T	59.8

Legend

- N/T indicates not tested

720p (Windows 7/8 x64)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
AVC-Intra 50 960*720 23.976	720p/24	5	10	18	22	28	N/T	21.1
AVC-Intra 50 960*720 25	720p/25	7	14	21	28	N/T	N/T	21.1
AVC-Intra 50 960*720 29.97	720p/30	8	15	24	32	N/T	N/T	21.1
AVC-Intra 50 960*720 50	720p/50	12	20	N/T	N/T	N/T	N/T	35.2
AVC-Intra 50 960*720 59.94	720p/60	11	N/T	N/T	N/T	N/T	N/T	35.2
AVC-Intra 100 1280*720 23.976	720p/24	10	19	28	37	N/T	N/T	28.1
AVC-Intra 100 1280*720 25	720p/25	12	21	31	N/T	N/T	N/T	35.2
AVC-Intra 100 1280*720 29.97	720p/30	11	20	31	N/T	N/T	N/T	35.2
AVC-Intra 100 1280*720 50	720p/50	18	N/T	N/T	N/T	N/T	N/T	59.8
AVC-Intra 100 1280*720 59.94	720p/60	19	N/T	N/T	N/T	N/T	N/T	59.8

Legend

- N/T indicates not tested

1080i (Mac OS 10.8.5/10.9.x)

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

Legend

- N/T indicates not tested
- Gray cells indicate 2 X 1 Gb

1080i (Windows 7/8 x64)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
1:1 10 bit	1080i/59.94	160	320	N/T	N/T	N/T	N/T	527
1:1 8 bit	1080i/59.94	130	260	N/T	N/T	N/T	N/T	439
DVC Pro HD 1440*1080 25	1080i/50	27	53	79	105	N/T	N/T	59.8
DVC Pro HD 1280*1080 29.97	1080i/60	18	35	53	69	86	100	59.8

Legend

- N/T indicates not tested
- Gray cells indicate 2 X 1 Gb
- Orange cells indicate 10 Gb connectivity required

1080p (Mac OS 10.8.5/10.9.x)

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

Legend

- N/T indicates not tested
- Gray cells indicate 2 X 1 Gb

1080p (Windows 7/8 x64)

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

Legend

- N/T indicates not tested

XDCAM HD422 (Windows 7/8 x64 and Mac OS 10.8.5)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		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/T	35.2
XDCAM HD422 CBR_59.94	720p/60	17	28	38	49	60	N/T	35.2

Legend

- N/T indicates not tested
- Gray cells indicate 2 X 1 Gb

Apple ProRes (Mac OS 10.8.5/10.9.x)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
ProRes 422 HQ	1080p/24	28	56	85	111	N/T	N/T	98.4
ProRes 422 HQ	1080p/25	46	80	101	N/T	N/T	N/T	161.7
ProRes 422 HQ	1080p/30	34	68	101	N/T	N/T	N/T	119.5
ProRes 422 HQ	1080p/50	56	N/T	N/T	N/T	N/T	N/T	196.9
ProRes 422 HQ	1080p/59.94	65	N/T	N/T	N/T	N/T	N/T	228.5
ProRes 422 HQ	720x486p29.97	13	26	39	52	65	N/T	45.7
ProRes 422 HQ	720p24	17	32	48	64	80	N/T	59.8
ProRes 422 HQ	720p50	30	60	89	N/T	N/T	N/T	105.5
ProRes 4444	1080p30	50	N/T	N/T	N/T	N/T	N/T	175.8
ProRes 422 720p59.94	720p59.94	25	49	72	N/T	N/T	N/T	87.9
ProRes 422	1080p25	30	59	89	N/T	N/T	N/T	105.5
ProRes 422 LT	1080p50	26	52	79	N/T	N/T	N/T	91.4
ProRes 422 Proxy	1080p50	13	27	41	N/T	N/T	N/T	45.7

Legend

- N/T indicates not tested
- Gray cells indicate 2 X 1 Gb

Apple ProRes (Windows 7/8 x64)

Resolution	Project Format	Number of Streams per client (MB/s)						GB/Hr
		1	2	3	4	5	6	
ProRes 422 HQ	1080p/24	33	N/T	N/T	N/T	N/T	N/T	116
ProRes 422 HQ	1080p/25	50	N/T	N/T	N/T	N/T	N/T	175.8
ProRes 422 HQ	1080p/30	41	N/T	N/T	N/T	N/T	N/T	144.1
ProRes 422 HQ	720x486p29.97	11	22	33	44	54	64	38.7
ProRes 422 HQ	720p24	14	28	42	54	67	N/T	49.2
ProRes 422 HQ	720p50	26	52	N/T	N/T	N/T	N/T	91.4
ProRes 422 720p59.94	720p59.94	20	41	N/T	N/T	N/T	N/T	70.3
ProRes 422	1080p25	27	N/T	N/T	N/T	N/T	N/T	94.9
ProRes 422 LT	1080p50	22	44	68	N/T	N/T	N/T	77.3
ProRes 422 Proxy	1080p50	12	25	N/T	N/T	N/T	N/T	42.2

Legend

- N/T indicates not tested
- Gray cells indicate 2 X 1 Gb

19.1 Adobe Premiere Hardware and Software Used During Testing

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

Platform	OS	CPU	Memory	Editor Version	ISIS Client
HP z400	Windows 7 64-bit SP1 Windows 8	W3550 3.06 8MB/1066 Quad-Core Intel Xeon	6 GB	Adobe Premiere CC v8	v4.7.4
Mac Pro	10.8.5 10.9.x	2 x 2.8GHz Quad-Core Intel Xeon (Harpertown)	6 GB	Adobe Premiere CC v8	v4.7.4