

NUUO Crystal™ Performance Guide

The Performance Guide provides performance test result of individual Recording Server, Metadata Server, IVS Server, and NuClient display; this guide shall help users to design system architecture. NUUO Calculator (<http://www.nuuo.com/calculator/>) is also a great tool for project design.

This guide is only for reference. The real server performance on the field depends on video source, network environment and all kind of variables.

Recording Server

The following is the performance result for system with single volume in RAID 5. The system is operating live view, playback, record and recycle simultaneously, but not doing backup.

The recording throughput of CT-8000R/CT-8000RP could reach 200 Mbps even with single 5900 RPM HDD. Below table provides the detail of Crystal Titan's optimal use case.

Without Local Display

CT-8000R/ CT-8000RP

Camera Parameter: H.264, high quality, and moderate traffic.

HDD Spindle Speed(RPM): 7200 RPM*

Volume Group: 1 Volume Group

Resolution	FPS (NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)
		Playback	Live view	
2M	30	16 ch	128 ch	64
5M	10	16 ch	128 ch	64

Performance of Volume Group:

Volume Group	Total Throughput	
	7200 RPM HDD	5900 RPM HDD
1 Volume Group	250 mbps	200 mbps
2 Volume Group	400 mbps	330 mbps
3 Volume Group	550 mbps	460 mbps

CT-4000/ CT-4000R

Camera Parameter: H.264, high quality, and moderate traffic.

Volume Group: 1 Volume Group

HDD Spindle Speed(RPM): 7200 RPM*

Resolution	FPS (NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)
		Playback	Live view	
1.3M	30	16 ch	100 ch	50
2M	15	16 ch	128 ch	64
5M	10	16 ch	72 ch	36

With Local Display (Complicated Scene)

CT-8000R/ CT-8000RP

Camera Parameter: H.264, high quality, and moderate traffic.

Volume Group: 1 Volume Group

HDD Spindle Speed (RPM): 7200 RPM*

Resolution	FPS (NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)	Local display(ch)
		Playback	Live view		
VGA/D1	30	16 ch	128 ch	64	16 ch, totally 64CH by tour
2M	7	16 ch	128 ch	64	16 ch, totally 64CH by tour
2M	30	16 ch	128 ch	64	4 ch, totally 64CH by tour
5M	10	16 ch	128 ch	64	4 ch, totally 64CH by tour

CT-4000/ CT-4000R

Camera Parameter: H.264, high quality, and moderate traffic.

Volume Group: 1 Volume Group

HDD Spindle Speed (RPM): 7200 RPM*

Resolution	FPS (NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)	Local display(ch)
		Playback	Live view		
VGA/D1	30	16 ch	30 ch	30	1
1.3M	8	16 ch	128 ch	64	1
2M	5	16 ch	128 ch	64	1
3M/5M/10M	Not Recommended				

* The total throughput of 7200 RPM HDD is 250 mbps for single Volume Group. If the HDD spindle speed is 5900 RPM, the recording throughput will become 200 mbps for 1 Volume Group.

H.265

Without Local Display

CT-8000R/ CT-8000RP

Camera Parameter: H.265, high quality, and moderate traffic.

HDD Spindle Speed(RPM): 7200 RPM*

Volume Group: 1 Volume Group

Resolution	FPS (NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)
		Playback	Live view	
2M	30	16 ch	128 ch	64
5M	10	16 ch	128 ch	64

CT-4000/ CT-4000R

Camera Parameter: H.265, high quality, and moderate traffic.

Volume Group: 1 Volume Group

HDD Spindle Speed(RPM): 7200 RPM*

Resolution	FPS (NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)
		Playback	Live view	
2M	30	0 ch	0 ch	23
2M	30	8 ch	32 ch	16

With Local Display (Complicated Scene)

CT-8000R/ CT-8000RP

Camera Parameter: H.265, high quality, and moderate traffic.

Volume Group: 1 Volume Group

HDD Spindle Speed (RPM): 7200 RPM*

Resolution	FPS (NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)	Local display(ch)
		Playback	Live view		
2M	30	16 ch	128 ch	64	4 ch, totally 64CH by tour

Metadata Server

CT-8000R/CT-8000RP/CT-4000/CT-4000R

Transaction frequency	Playback (Metadata+Video)	Live View (Metadata+Video)	Total Metadata channel
80 transaction /5 sec	16 ch	80 ch	80 ch

IVS Server

Below is the performance test result of IVS services.

IVS shall get 2nd or 3rd streaming for analysis in order to allow server to have more IVS channels.

Frame rate is crucial; lower frame rate could increase IVS channels.

All network services enabled in one server

Condition: CPU below 90%; Liveview/playback - difference ± 1.5 fps

CT-8000RP/CT-8000RP

Record Resolution/ FPS(NTSC)	IVS Resolution/ FPS(NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)	IVS Channel	Total Bitrate (mbps)	IVS Bitrate
		Playback	Live view				
2M/30fps	2M/30fps	16ch	128ch	64	3	250 mbps	4 mbps
2M/30fps	1.3M/30fps	4ch	32ch	16	6	64 mbps	3 mbps
2M/30fps	D1/30fps	16ch	128ch	64	6	250 mbps	1 mbps
2M/30fps	D1/15fps	16ch	128ch	64	11	250 mbps	1 mbps
2M/30fps	CIF/30fps	16ch	128ch	64	7	250 mbps	0.5 mbps
1.3M/30fps	1.3M/30fps	4ch	32ch	16	8	48 mbps	3 mbps
D1/30fps	D1/30fps	16ch	128ch	64	10	64 mbps	1 mbps

CT-4000/CT-4000R

Record Resolution/ FPS(NTSC)	IVS Resolution /FPS(NTSC)	Remote Connections (Stream out)		Optimal Recording (ch)	IVS Channel	Total Bitrate (mbps)	IVS Bitrate
		Playback	Live view				
2M/30fps	D1/30fps	3ch	32ch	16	1	64 mbps	1 mbps
2M/30fps	D1/15fps	2ch	32ch	16	2	64 mbps	1 mbps
2M/30fps	CIF/30fps	3ch	32ch	16	1	64 mbps	0.5 mbps
D1/30fps	D1/30fps	3ch	32ch	16	1	16 mbps	1 mbps

Pure IVS server (only IVS/MDS enabled)

Condition: CPU below 90%; Liveview/playback - difference ± 1.5 fps

CT-8000RP/CT-8000RP

Resolution	FPS (NTSC)	Bitrate per ch	IVS Channel
5M	15fps	4 mbps	7
2M	30fps	4 mbps	6
D1	30fps	1 mbps	9
D1	15fps	1 mbps	16
CIF	30fps	0.5 mbps	9

CT-4000/CT-4000R

Resolution	FPS (NTSC)	Bitrate per ch	IVS Channel
D1	30fps	1 mbps	1
D1	15fps	1 mbps	2
CIF	30fps	0.5 mbps	1

NuClient/NuMatrix

Camera Parameter: H.264, high quality, and moderate traffic.

CPU: i7-3770k, 80% loading

Resolution	Bitrate	FPS	Channel
D1	540 kbps	20	83 ch
2M	1080 kbps	10	30 ch
2M	4 mbps	20	13 ch