Case Study for GV-Hot Swap NVR System V5:

Multi-Story Building with Retail Stores, Offices and Parking Lot

Table of Contents

1. Case Brief

The client needed a surveillance solution to ensure the safety of a multi-story building. Floors 3 to 4 are parking lots, the second floor is retail area, and the first floor includes retail area and restaurants and a security guard room. Located in the basement is the security control room and office area for employees.

2 GV-SD220-S and **4 GV-BL2410** were installed on the 4th floors to monitor the activities in the parking lots. The PTZ capability of GV-SD220-S makes them ideal for tracking movements in the parking lot. The parking lot on the 3rd floor is set up the same way with **2 GV-SD220-S** and **4 GV-BL2410**.

A retail store occupies the entire 2nd floor and part of the 1st floor, and the retail areas are covered by **32 GV-BX2400**. An additional **9 GV-BX2400** were mounted to record the transactions at the 9 cash registers on the 1st floor, and each cash register has a POS system installed with GeoVision's **POS Text Sender**. Also on the ground floor are **10 GV-BL2410** to cover the loading zone at the back door, elevator entrances, and parking lot entrances. At the main entrance, a **GV-FE4301** fisheye camera was mounted on the ceiling to monitor all angles. In addition, **3 GV-3D People Counters** and Asus Xtion Pro Live were set up to count the number of customers entering and exiting.

In the basement, a security control room was set up to house 2 **20-bay GV-Hot Swap NVR System V5**, which receive and record all 64 IP cameras installed in the building, and can send videos to the **GV-Center V2**. The GV-Center V2 is located in a security guard room on the 1st floor, and during closed hours, the security guard can receive live videos and alert messages upon motion detection on the GV-Center V2. During business hours, the staff in the basement office can monitor all 64 IP channels on the GV-Hot Swap NVR System V5. If the 2 GV-Hot Swap NVR System V5 fail to record for whatever reason, the **GV-Failover Server** in B1 will take over and make sure the videos are recorded properly.

Alarm buttons were mounted in the restroom stalls on floors 1 to 4, and each floor uses an **8-port GV-I/O Box** to relay the alert to the GV-Hot Swap NVR System V5. When the alarm button is pushed in the event of an emergency, the B1 and 1F security staff will be notified and the E-Map on the GV-Hot Swap NVR System V5 allows staff to quickly locate the alarm button pushed.

2. Suggested Installation
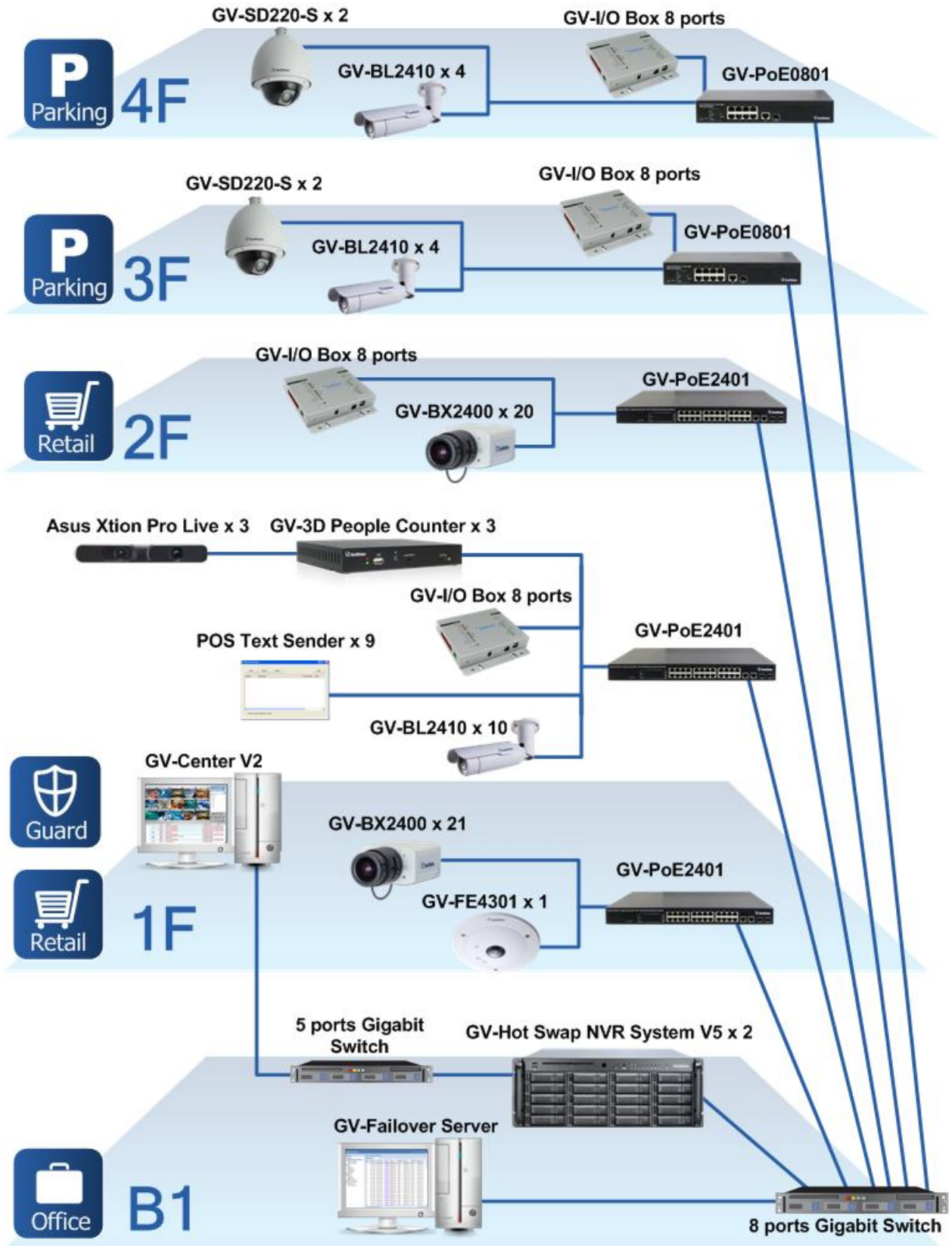
3. Purchase List for the Suggested Installation

3.1 GeoVision Products

Floor	Products	Quantity	Note
4F Parking	GV-SD220-S	2	
	GV-BL2410	4	
	GV-I/O Box 8 ports	1	
	GV-PoE0801 Switch	1	8 PoE ports, 10/100BaseTX, PSE plus 2-port Gigabit Uplink
3F Parking	GV-SD220-S	2	
	GV-BL2410	4	
	GV-I/O Box 8 ports	1	
	GV-PoE0801 Switch	1	8 PoE ports, 10/100BaseTX, PSE plus 2-port Gigabit Uplink
2F Retail	GV-BX2400	20	
	GV-I/O Box 8 ports	1	
	GV-PoE2401 Switch	1	24 PoE ports, 2 Gigabit TP/SFP Combo Uplink ports
1F Retail	GV-BX2400	21	
	GV-FE4301	1	
	GV-BL2410	10	
	GV-PoE2401 Switch	2	24 PoE ports, 2 Gigabit TP/SFP Combo Uplink ports
	GV-I/O Box 8 ports	1	
	GV-3D People Counter	3	
	GV-POS Text Sender S/W	9	Install on the 9 POS Systems
1F Security	GV-Center V2 S/W	1	Install on desktop computer
B1 Office & Control Room	GV-Hot Swap NVR System V5-4U, 20-Bay	2	
	GV-POS Text Sender Dongle	1	12 ports (Install on 1 GV-Hot Swap NVR System V5)
	GV-Failover Server (SW + Dongle)	1	Install on desktop computer

3.2 Non-GeoVision Products

Floor	Products	Quantity	Details
4F Parking	Network Cable	8	1. Cat 5e x 4 (GV-BL2410 to GV-PoE0801) 2. Cat 5e x 2 (GV-SD220-S to GV-PoE0801) 3. Cat 5e x 1 (GV-I/O Box to GV-PoE0801) 4. Cat 6 x 1 (GV-PoE0801 to 8 ports Gigabit Switch)
	Alarm Button (Normally Open)	5 - 8	To connect with GV-I/O Box
3F Parking	Network Cable	8	1. Cat 5e x 4 (GV-BL2410 to GV-PoE0801) 2. Cat 5e x 2 (GV-SD220-S to GV-PoE0801) 3. Cat 5e x 1 (GV-I/O Box to GV-PoE0801) 4. Cat 6 x 1 (GV-PoE0801 to 8 ports Gigabit Switch)
	Alarm Button (Normally Open)	5 - 8	To connect with GV-I/O Box
2F Retail	Network Cable	22	1. Cat 5e x 20 (GV-BX2400 to GV-PoE2401) 2. Cat 5e x 1 (GV-I/O Box to GV-PoE2401) 3. Cat 6 x 1 (GV-PoE2401 to 8 ports Gigabit Switch)
	Alarm Button (Normally Open)	5 - 8	To connect with GV-I/O Box
1F Retail	Asus Xtion Pro Live	3	To connect with GV-3D People Counter
	Network Cable	47	1. Cat 5e x 21 (GV-BX2400 to GV-PoE2401) 2. Cat 5e x 1 (GV-FE4301 to GV-PoE02401) 3. Cat 5e x 10 (GV-BL2410 to GV-PoE2401) 4. Cat 5e x 1 (GV-I/O Box to GV-PoE2401) 5. Cat 5e x 9 (POS System to GV-PoE2401) 6. Cat 5e x 3 (GV-3D People Counter to GV-PoE2401) 7. Cat 6 x 2 (GV-PoE2401 to 8 ports Gigabit Switch)

1F Security	PC & Monitor	1	For installing GV-Center V2 (Intel Core i3, 4 GB Dual Channel RAM, 1 TB HDD)
	Network Cable	1	Cat 6 x 1 (GV-Center V2 to 5 ports Gigabit Switch in B1)
B1 Office & Control Room	PC	1	For installing GV-Failover Server (Intel Core i5, 8 GB Dual Channel RAM, 1 Gigabit LAN, SATA x 6)
	Monitor	3	For GV-Failover Server and 2 GV-Hot Swap NVR System V5
	7200 rpm hard disk	4	For recording videos on GV-Failover Server
		40	For recording videos on the 2 GV-Hot Swap NVR System V5
	Gigabit Switch	2	- 8 Ports Gigabit Switch to connect: • GV-PoE0801 x 2 • GV-PoE2401 x 3 • GV-Hot Swap NVR System V5 x 2 • GV-Failover Server x 1 - 5 Ports Gigabit Switch to connect: • GV-Hot Swap NVR System V5 x 2 • GV-Center V2 x 1
	Network Cable	5	- Cat 6 x 2 (8 Ports Gigabit Switch to GV-Hot Swap NVR System V5) - Cat 6 x 1 (8 Ports Gigabit Switch to GV-Failover Server) - Cat 6 x 2 (5 Ports Gigabit Switch to GV-Hot Swap NVR System V5)

4. Recommendations and Limitations for GV-Hot Swap NVR System V5

4.1 Suggested Hard Disk Arrangement

The table below shows how to arrange **40 2TB hard disks** for recording in two **20-bay GV-Hot Swap NVR System V5** and the number of days you can record under Round-the-Clock (RTC) Mode and Motion Detection Mode. Each GV-Hot Swap NVR System V5 will record 32 channels. You can divide the 32 channels into 4 storage groups and assign 5 hard disks to each storage group. The GV-IP Cameras are set to VBR (Variable Bit Rate) mode.

	Storage Group	Camera	Hard Disk	Recording Capacity	
				RTC	Motion
GV-Hot Swap NVR System V5 #1	Group 1	• 4F: GV-SD220-S x 2 • 4F: GV-BL2410 x 4 • 3F: GV-SD220-S x 2	HDD 1 ~ 5	At least 19 days of data	At least 38 days of data
	Group 2	• 3F: GV-BL2410 x 4 • 2F: GV-BX2400 x 4	HDD 6 ~ 10		
	Group 3	• 2F: GV-BX2400 x 8	HDD 11 ~ 15		
	Group 4	• 2F: GV-BX2400 x 8	HDD 16 ~ 20		
GV-Hot Swap NVR System V5 #2	Group 1	• 1F: GV-BX2400 x 8	HDD 1 ~ 5		
	Group 2	• 1F: GV-BX2400 x 8	HDD 6 ~ 10		
	Group 3	• 1F: GV-BX2400 x 5 • 1F: GV-FE4301 x 1 • 1F: GV-BL2410 x 2	HDD 11 ~ 15		
	Group 4	• 1F: GV-BL2410 x 8	HDD 16 ~ 20		

Note:

1. For Motion Detection mode, It is assumed that **there are 500 motion events per day that each lasts 1 minute**.
2. The data is based on calculation from the GV-IP Camera Bandwidth and Recording Size Calculator: http://www.geovision.com.tw/english/Bandwidth.asp
3. The number of hard disks assigned for a storage group may depend on the actual environments. Under Motion Detection Mode, You may assign more hard disks to the group that would have more motion events.

4.2 Recommended Hard Disk Brand

To maintain system stability and to keep your recordings safe when using GeoVision software, we advise you to use any of the recommended and/or the tested hard disk drives listed below.

Brand	Series
Seagate	Barracuda (XT Series, ES.2 Series, 7200 Series)
	SV35 Series
	Constellation ES Series
Hitachi	Hitachi Series
Western Digital	Caviar Black
	Caviar Blue
	RE Series

To find the tested hard disk models, see:

http://pd.geovision.tw/technotice/Others/Recommended_HDD.pdf

4.3   Suggested Network Arrangement

GV-Hot Swap NVR System V5 has two built-in Gigabit Ethernet ports. In the recommended installation illustrated above, each of the two GV-Hot Swap NVR System V5 receives video from 32 GV-IP Cameras installed in the building, and then transmits the 32 IP channels to GV-Center V2. In this case, set one Gigabit Ethernet for the incoming 32 channels and one Gigabit Ethernet port for the outgoing 32 channels.

Two Gigabit switches are installed to avoid network bottleneck. You will need to use one Gigabit switch for the incoming 64 channels and one Gigabit switch for the outdoing 64 channels by organizing the channels into two different segments.
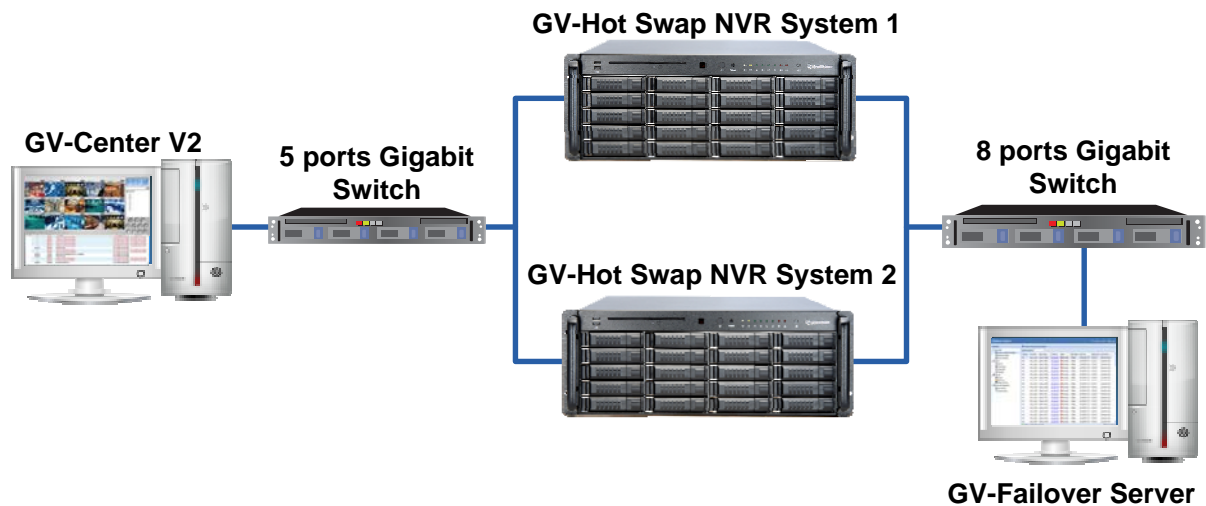
5.   Ethernet Cable Requirements

When installing, each Ethernet cable cannot exceed 100 meters. In order for the PoE switches to deliver power without problem, it is recommended to use Cat 5 / 5e and Cat 6 cables. The high quality Ethernet cable reduces lost during power transmission. The wiring cable types are as below.

10BaseT: 2-pair UTP/STP Cat. 3, 4, 5 cable, EIA / TIA-568 100-ohm (Max. 100 m)

100BaseTX: 2-pair UTP/STP Cat. 5 cable, EIA / TIA-568 100-ohm (Max. 100 m)

1000BaseT: 4-pair UTP/STP Cat. 6 cable, EIA / TIA-568 100-ohm (Max. 100 m)

6. Appendix

You can refer to the following user manuals to see how to set up the GeoVision products required.

GV-DVR User's Manual

http://pd.geovision.tw/jasonsu/DVR/V8580/Manual/V8.5.8.UserManual(UMV858-A-EN).zip

■ Connecting IP Cameras to GV-Hot Swap NVR System V5: *Section 2.5 IP Channel Setup*

■ Integrating GV-POS Text Sender: *Section 7.1.1 Windows-Based Direct POS Integration*

GV-I/O Box 8 Ports Installation Guide

http://www.geovision.com.tw/Install_Products/GV-IO-Box-8.pdf

GV-3D People Counter User's Manual

http://pd.geovision.tw/castaly/GV3DCounter/Manual/GV-3D People Counter User's Manual(3DPCV101-A-EN).zip

■ Installing GV-3D People Counter: *Section 2.1 Connecting the Device*

■ Configuring counting conditions: *Section 4.2.2 People Counter Settings*

GV-Failover Server User's Manual

http://ftp.geovision.tw/FTP/Support/RedundantServer\V1020\GV-Redundant and Failover Server User Manual(RFSV102-A-EN).zip

■ Connecting GV-System: *Section 3.2 Connecting GV-System to GV-Redundant Server / GV-Failover Server*

GV-Center V2 User's Manual

http://pd.geovision.tw/jasonsu/DVR/V8580/Manual/V8.5.8.CMSManual(CSV858-A-EN).zip

■ Connecting to GV-System: *Section 1.5 Connection to Center V2*