



6SSL.L.C.

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1. INTRODUCTION

License plate recognition (LPR) has numerous applications in everyday life, besides the ones that drivers know from relation with the state. There are many areas where automatic license plate recognition can be used successfully, and all of them rely on the two most important values a LPR system brings: automation and greater security.

6SSLPR software is meant to fix problems in parking, security, retail, and comes with extra advantages of management and reports. It can also be integrated in a state institution parking, a private company, universities, a transport company, a real estate, retail, traffic management, bus lane enforcement, toll stations.

The main element is the 6SSLPR Smart Client Interface. Vehicles recordings, receipts, reports and statistics are accessible in this program and can be accessed from any Smart Client with valid authentication.

6SSLPR enable the user to set different actions to be executed when a license plate from the database is recognized: can open a barrier, can change a traffic light or can send an e-mail, popup on screen. It can thus be used for a more efficient management of a parking, office buildings, residential area of any size. For example, when entering a parking the plate is scanned and the time is recorded. When exiting, depending on time spent inside, a cost can be calculated.

In addition, 6SSLPR have also the option to save plate numbers as blacklist/whitelist that can be used to trigger actions like close/open barrier, fire siren alarm sound, etc...

6SS LPR Main Features

- Fully integrated with All Milestone XProtect versions
- Supports all cameras supported by Milestone VMS (approximately 6700 camera types)
- Filter through history based on various criteria
- One click data Excel Export
- Scheduled reports (Daily, Weekly, Monthly)
- Auto data retention period handling
- Alarming capabilities (Email, SMS)



2. GETTING STARTED

2.1.System Requirements

- Windows OS 7 or above
- Milestone Smart Client (2016 or above)
- 6SS-LPR Management (V5.1.5 or above)
- ARH Carmen FreeFlow (version 7.3.11 or above)

2.2.Quick Start

- Unpack the Recognition Server Folder on your drive.
- Start the installation process by opening the "Setup.exe".
- Choose the installation folder of the recognition server.
- Finalize installation to the PC.
- Once the process completes, the Recognition Server Plugin will be ready to use.

2.3.System Introduction

The server part of the system consists of 2 main components: Management and Recognition. Each LPR system contains only one Management server, and one or more Recognition servers, depending on the project size and the system's distributed architecture. Both processes can be installed and ran on the same server, but each with its own configuration. The machine has to be licensed first before doing anything on the LPR system after the installation.

Below is a figure describing the architecture of the system.



FIGURE 1: 6SS LPR ARCHITECTURE



3. 6SS LPR INSTALLATION

3.1.SQL Server Configuration

The configuration for the 6SS LPR database needs to be done on the server where Microsoft SQL server is installed.

3.1.1. Database Creation

Double click the given SQL script in order to create 6SS Database and click the execute button to run the query.

🨓 CreateDataBase.sql - user-PC.master (user-	er-PC\user (51)) - Microsoft SQL Server Management Studio (Administrator)	- 0 ×
File Edit View Query Project Debug	ig Tools Window Help	
🗄 🛅 🕶 🔤 🖉 🛃 🥥 🔔 New Query	- · · · · · · · · · · · · · · · · · · ·	
🗄 🕮 🙀 🛛 master 🕞 🚽	<u>! Execute</u> 】 Debug = ✓ 野 回 ⊒ 野 個 御 個 二 2 連 編 4 -	
Object Explorer 🔷 🕂 🖓	X CreateDataBase.sql(user-PC\user (51)) ×	.
Connect - 🛃 👯 🗉 🍸 👩 😹	USE [master]	+
	GO	
	USE [DB6SS]	
	60	
	□CREATE TABLE [db0].[DetectedObjects](-
	[arb] Latri Latri (1,1) with Hole,	
	[EnglishText] [nvarchar](50) NULL,	
	[Camera] [nvarchar](150) NULL,	
	[TextA] [nvarchar](50) NULL,	
	[Tue] [nvarchar](50) NULL.	
	[Platecolor] [nvarchar](50) NULL,	
	[PlateBackColor] [nvarchar](50) NULL,	
	[PlateCountryLong] [int] NULL,	
	PlateCountryShort [int] NUL,	
	[PlateStateShort] [int] NULL,	
	[FullFrame] [image] NULL,	
	[PlateFrame] [image] NULL,	
	[date] [Int] WUL,	
	[X] [int] NUL,	
	[Y] [int] NULL,	
	[PlateWidth] [int] NULL,	
	[/latelength] [int] NULL,	
	CONSTRAINT FPK 65SLPRI PRIMARY KEY CLUSTERED	
	JWITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, ISHORE_DOP_KET = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON) ON [PRIMARY]	*
	100 % * "" Up to 0 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 100 % % * 1	0.00 0 rours
		01000
Ready	Ln1 Col1 Ch1	INS
📀 健 🚞 💽	n 🖉 🚺 🍐 条 🚺 🚹 🚺 🚺 🔚 🔣 🔛 🕬 🖇 🍐 🖬	8:25 PM 12/12/2018

FIGURE 2: CREATE 6SS DATABASE USING SQL QUERY

DB6SS database is created and appears in SQL server as shown below:



FIGURE 3: DATABASE CREATED



3.1.2. User Creation and Authentication

Open the "Security" tab, right-click on Logins and select "New Login".



FIGURE 4: ADD NEW LOGIN



In the Login window:

- Click General tab on the left side
- Set Login Name "6ssLpr" and Password "6ssLpr"
- Select DB6SS as Default Database

🔒 Login Properties - 6ssLpr			_		×		
Select a page	Script 🔻 📭 Help						
Server Roles User Mapping Securables	Login name:	GssLpr		Search	1		
🚰 Status	 Windows authentication SQL Server authentication 						
	Password:	•••••					
	Confirm password:	•••••					
	Specify old password						
	Old password:						
	Enforce password policy						
	Enforce password expira	tion					
	User must change passv	vord at next login					
				_	_		
Connection	Map to Credential		~	Add			
Server: localhost	Mapped Credentials	Credential Prov	ider				
Connection:							
View connection properties							
Progress				Remov	/e		
Ready	Default database:	DB6SS	~				
4 ^{4 b} A	Default language:	English	~				
			ОК	Cance			

FIGURE 5: FILL THE FIELDS TO ADD NEW LOGIN



In User Mapping, check DB6SS, db_owner and public checkboxes as shown in Figure 6.

🚦 Login Properties - 6ssLpr				_		×
Select a page Provide the second seco	Script	🕶 [Help				
Server Roles	Users map	oped to this login:				
Securables	Map	Database	User	Default Schema		^
Status		DB6SS	6ssLpr	dbo	-	.
		master				
		model				
		msdb				
		ReportServer				
		ReportServerTempDB				
		Surveillance				
		SurveillanceFacesSa				
		SurveillanceLogServer				
		tempdb				~
Connection	Guest	account enabled for: DB6S	s 3			
Server:	db_ac	cessadmin				
localhost		itareader				
Connection:	db_da	tawriter				
	db_dd	lladmin				
View connection properties	db_de	enydatareader enydatawriter				
	db ov	vner				
Progress	db_se	curityadmin				
Ready	v public					
	<u> </u>			ОК	Cance	

FIGURE 6: USER MAPPING

Click ok when finish and notice the 6ssLpr login appears under Security - Logins.



FIGURE 7: ADDED LOGIN



3.1.3. Server Authentication

Right click on the server and select Properties, select security tab and choose SQL Server and Windows Authentication mode.

Server Properties -			_		×
Select a page Providence and the second seco	🖾 Script 🔻 📑 Help				
Memory Processors Connections Database Settings Advanced Permissions	Server authentication Windows Authentication mo SQL Server and Windows A Login auditing None Failed logins only Successful logins only Both failed and successful logins only Enable server proxy account	ode Authentication mode			
Connection	Password:	*****			
Server: localhost Connection:	Options				
View connection properties	 Enable C2 audit tracing Cross database ownership of 	chaining			
Progress					
Ready					
			ОК	Cance	el

FIGURE 8: SERVER AUTHENTICATION



A restart must be done for SQL Server and SQL Server Agent instances as shown in the below figure.

🎑 Services						- 0
File Action View	Help					
) 🗟 🛛 🛐 🕨 🔲 🕪 🕨					
🔍 Services (Local)	Services (Local)	-				
	SQL Server (MSSQLSERVER)	Name	Description	Status	Startup Type	Log On As
	Stop the service Pause the service Restart the service Description: Provides storage, processing and controlled access of data, and rapid transaction processing.	Security Center Sensor Data Service Sensor Data Service Sensor Card Removal Policy Senart Card Removal Policy Software Protection Soft Server Agent (MSSQLSERVER) Soft Server Agent (MSSQLSERVER) Soft Server Browser Soft Server Distributed Replay Client Soft Server Integration Services 12.0	The WSCSVC (Windo Delivers data from a Monitors various sen A service for sensors Sentinel RMS License Supports file, print, a Manages profiles an Provides notification Manages access to s Creates software devi Allows the system to Enables Simple Netw Receives trap messag Enables the downloa This service is used f Verifies potential file Service to launch full Supplies online analy Provides SQL Server One or more Distribu Provides trace replay Provides manageme	Running Running Running Running Running Running Running Running	Automatic (D Manual (Trig Manual (Trig Manual (Trig Automatic Automatic (T Disabled Automatic Manual (Trig Manual (Trig Manual Automatic Manual Automatic (D Manual Manual Automatic Manual Automatic Manual Automatic Disabled Manual Manual Automatic	Local Service Local System Local Service Network Service Local Service Network Service Local Service NT Service\MSSQLFDLa NT Service\MSSQLSERV NT Service\MSSQLSERV NT Service\SQL Server D NT Service\SQL Server D NT Service\SQL Server D NT Service\SQL Server D NT Service\MST
		SQL Server Reporting Services (MSSQLSERVER)	Manages, executes, r	Running	Automatic	NT Service\ReportServer

FIGURE 9: RESTART SQL SERVER INSTANCES



3.2. Carmen FreeFlow Installation

3.2.1. Setup Wizard

Navigate to Carmen FreeFlow setup folder and run setup as shown in Figure 10.

```
This PC > Data (D:) > ARH > Arabic Engine > 20171027-CARMEN_Freeflow-7.3.1-17 > 20171027-CARMEN_Freeflow-7.3.1-17 > vin > 20171027-CARMEN_Freeflow-7.3.1-17
                     \sim
   Name
                                         Date modified
                                                           Туре
                                                                            Size
    ms
                                          2017-11-07 8:47 AM File folder
    ____ setup.xб4
                                          2017-11-07 8:48 AM File folder
    📕 setup.x86
                                          2017-11-07 8:48 AM File folder
                                         2017-11-07 8:48 AM File folder
     setupdata
    🖾 Arh
                                         2015-01-09 8:23 AM ICO File
                                                                                  15 KB
ſŧ
   autorun 🐻
                                         2017-10-27 8:14 AM Setup Information
                                                                                  1 KB
ſ€
   readme
                                          2016-06-21 8:08 AM Text Document 4 KB
   👼 setup
                              2016-07-14 7:36 AM Application
                                                                           932 KB
```

FIGURE 10: CARMEN FREEFLOW SETUP

Select the 3rd option "CARMEN Full" for full installation package and click on Next.

P	urpose of the installation		×
	-Select the installation packa	ge:	
	C CARMEN Minimal :	drivers, function libraries	
	C CARMEN Typical :	recommended for Users drivers, function libraries, demos	
	CARMEN Full:	recommended for Developers drivers, function libraries, demos, utils, SDK, docs	
	Exit	Next	

FIGURE 11: CARMEN INSTALLATION PURPOSE



You will be presented by the Carmen FreeFlow Software window with installation progress. Click ok once the installation is completed.



FIGURE 12: CARMEN FREEFLOW SOFTWARE INSTALLATION

3.2.2. Engine Manager

Search for Engine Manager and click to open.



FIGURE 13: ENGINE MANAGER



Click on **Browse** (1) and navigate to the Arabic engine folder and choose either "cmanpr-arab-7.3.10.175_19Q1-x64" or "cmanpr-arab-7.3.10.175_19Q1-x86" depending on your platform. Then click **Install engines** (2) and select the downloaded Arabic engine from the **Installed engines** (3) and click on **Change** (4) to set it as default engine, you will be notified that the "Default engine has been set successfully" as shown in **Figure 14**, click on **OK** (5).

Pingine Manager for 64-bit engines	- 🗆 X
Engine(s) directory:	
	Browse
Engine(s) package:	1
D: \ARH \Arabic Engine \Arabic Engine LAST ONE	Cmanpr-arab-7.3.10.175_19Q: Browse
Found engines:	Installed engines:
cmanpr-7.3.10.175-arab	cmappr-7, 2, 7, 108 : general
	3 cmanpr-7.3.10.175 : arab
	cmanpr-7.3.9.74 : latin_general
Engine Manager for 64	-bit engines X
Default engine has b	een set successfully!
	5 ок
	,
	Engine type
	ANPR C ACCR C UIC
	Default engine: 4 Change
	cmanpr-7.3.10.175 : arab
2 Install engines	, Uninstall engines
UnInstalling cmappr-7.3.10.97OK	
UnInstalling cmanpr-7.3.10.97 : arabOK	
1	

FIGURE 14: INSTALL ARABIC ENGINE



3.3.<u>Recognition Server</u>

3.3.1. Setup Wizard

First open the copied Recognition Server Folder > Setup > Debug and double click on Setup. The setup wizard opens, click Next to continue.



FIGURE 15: RECOGNITION SERVER SETUP WIZARD



The installation folder windows let you specify the path to where the recognition server folder will be created as shown in **Figure 16**. In this folder you will find the Recognition Server setup application along with the DLL used. Click next to continue and the setup will be installed as shown in **Figure 17**.



FIGURE 16: RECOGNITION SERVER INSTALLATION FOLDER





FIGURE 17: INSTALLATION SETUP

Once the recognition server setup is installed right click on "RecognitionServer" application found under the specified destination folder as shown below and choose copy to create a shortcut on your desktop.





FIGURE 18: RECOGNITION SERVER FOLDER

Note that when you double click on the application previously launched a pop up message appears as showing below indicating that another instance is already running in the background if you still want to stop the application from running click on yes. This will stop the Recognition Server functionality of detecting license plates.

Recognitio	
- shortcut	Question ×
	Another instance of the app is already running, Do you want to stop the applicationi?
B.C.	Yes No

FIGURE 19: RECOGNITION SERVER INSTANCE



3.3.2. <u>Recognition Server Interface</u>

Running the application for first time use will prompt you to enter the management server's IP address. Choose windows authentication mode and make sure to check "Auto-login" checkbox to reconnect directly to the server next time you launch the application.

🖇 Connect to serve	r X
Server address:	http://localhost/
Authentication:	Windows authentication (current user) $\qquad \qquad \lor$
User name:	6SS\developer 🗸
Password:	
	Remember password
	Auto-login
	Connect Cancel

FIGURE 20: CONNECT TO MANAGEMENT SERVER

The first tab shown in **Figure 21** is LPR Recognition Server. Here you can specify from the list of cameras connected to the recording server (by clicking on the button Select Camera) the cameras you would like to be used for LPR detection.

You will notice after properly setting the required cameras and the SQL server name, a set of detected license plate number will be filled line by line listing the camera name that has captured the plate number along with its country, state, region, and the date when the plate number is recognized by the camera, in addition to the plate number color and its appropriate screenshot image.

PR Recognition SQL Server and Database LPR Engine Calibration BlackList Plate Number Select Camera ANPR DirectShow Virtual Video Server (0 0.0.1) - Camera 1								
Camera	Region	OCR	State	Country	Plate Color	Confidence	Date	Image
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	Р	P38794	Dubai	United_Arab_Emirates	WHITE	73	2019-06-17 12:41:38 PM	P 38794
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	A	A41786	RAK	United_Arab_Emirates	WHITE	72	2019-06-17 12:41:34 PM	A 41786
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	N	N30197	Dubai	United_Arab_Emirates	WHITE	71	2019-06-17 12:41:29 PM	N 30197
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	G	G43125	Dubai	United_Arab_Emirates	WHITE	69	2019-06-17 12:41:27 PM	G 43125
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	P	P38794	Dubai	United_Arab_Emirates	WHITE	76	2019-06-17 12:41:25 PM	P 38794
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	Р	P38794	Dubai	United_Arab_Emirates	WHITE	63	2019-06-17 12:41:24 PM	P 38794
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	в	44381B	RAK	United_Arab_Emirates	WHITE	73	2019-06-17 12:40:15 PM	44381
DirectShow Virtual Video Server (0.0.0.1) - Camera 1	в	44381B	RAK	United_Arab_Emirates	WHITE	73	2019-06-17 12:39:24 PM	44381

FIGURE 21: "LPR RECOGNITION" TAB



In the "SQL Server and Database" tab you need to specify the name of the SQL Server you want to connect to, as shown in the figure below.

6SS Recognition Server	– 0 X	
LPR Recognition SQL Server and Database LPR Engine Calibration BlackList Plate Numb	a A	
UPR Recognition Sull Server and Database UPR Engine Calibration Block Unit Plate Numb SQL Server Name 127.0.1	site the second se	

For the engine calibration use the fields shown in **Figure 23** under "LPR Engine Calibration" tab to adjust/manipulate the parameters for better result and accuracy. Click "Save" button once finished to save the calibration parameters.

below is an example of calibration for the Arabic engine.

6SS Recognition	Server				- 0 ×
LPR Recognition	SQL Server and Database	LPR Engine Calibration Blac	kList Plate Number		
	Engine	cmanpr-7.3.10.1	75 : arab		
Time Out	1000	General	[1	
Contrast Min	4	Depth	[265	
Size	31	Plate Co	mf [2	
Size Min	2	Posfreq	[
Size Max	72	Adapt E	wironment	1	
Xtoyres	100	Data Fil	e [cmanpr-10.175-arab.dat	
GapToSpace	0	Special	hars to Unicode	0	
Nchar Min	2	Slant M	ax [48	
Nchar Max	17	Color T	-pe	0	
Analyzecolors	s 1	Unicode	in Text	0	
Slope	2	Slant		1	
Slope Min	-34	Slant M	in [-49	000
Slope Max	36			SAVE	

FIGURE 23: "LPR ENGINE CALIBRATION" TAB

FIGURE 22: "SQL SERVER AND DATABASE" TAB



A plate number can be listed as a blacklist or whitelist using the "Blacklist Plate Number" tab. Specify the plate number, type, status (enabled/disabled), and the event/action that may be attached to this plate number as shown in the below figure.

🖶 6SS Recognition Server						- 🗆 X
LPR Recognition SQL Server and Database LPR Engine Calibri	ation BlackList Plate Number					
Alert Plate Number 123456 Type BlackListed	Status Enabled	Y Event/Action	lackList Event	Add Alert Update Status	Delete Alert	
Plate Number	Туре	Status	Event / Action			
123456	BlackListed	Enabled	BlackList Event			
					20 A.	1999 B

FIGURE 24: "BLACKLIST PLATE NUMBER" TAB