DEDICATED MICROS

NetVu Connected
Key Benefits

Ver 1.0 14th March 2023

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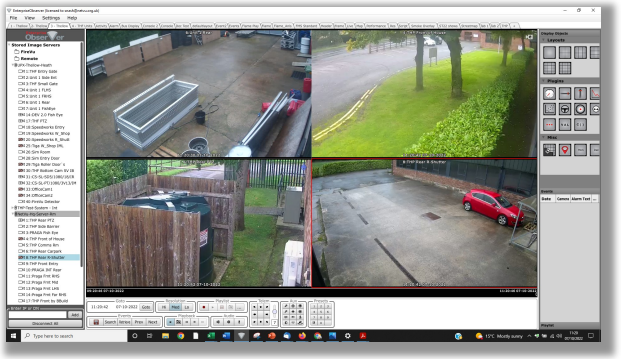
Product Range

Camera Range

NVR Server Range

Decoders & Video Wall

Managed Network



VMS / PSIM / ARC

Joystick Keyboard

Product Range

- Uniplex NVRs
  - UPX-L – Low cost Entry level up to 16 channels
  - UPX-S – Entry level Desktop server – 64 channels
  - UPX-R – 4 / 8 drive Servers, Optional RAID, Multiple Instances (256 channels etc)

- SmartVu SV-xx Camera Range
  - 5MP and 4K Resolutions, Sony Starlight
  - Typically Motorized varifocal
  - Vandal, Bullet, Fisheye, PTZ options
  - Dual Light option

- SmartVu Lite SL-xx Camera Range
  - 2MP/1080 Resolutions
  - Fixed lens options

- Further SmartVu Cameras in Development
  - PTZ Vandal Dome & Bullet
  - Dual Light Cameras

Feature Comparison

Model	Description	Channels	Storage	Notes
UPX-L	Entry level, low cost NVR	8 PoE, Expandable licence 12 & 16	Single Internal drive	Includes single device Enterprise Observer Lite
UPX-S	Desktop, medium system NVR	Up to 64 Channels	2 or 5 User serviceable drives	Managed switch support, fully deterministic discovery, mirrored drive support
UPX-R	19” Rack mount NVR multi drive Enterprise Server	Multiple instances of 64 Channels	4 or 8 User serviceable drives	Adds RAID support
UPX-V	Virtualised / containerised software for operation on Enterprise servers	Multiple instances of 64 Channels	-	Subject to specific application

Uniplex NVR Key Features

- Single IP access to all channels, multiple synchronised playback etc.
- Independent VMD and Activity operation.
- Activity based image search.
- Multiple Profiles for Live Transmission and Recording
- Event handling on physical interfaces, meta data, and script driven.
- PowerScript - to enable the client to develop their own opportunities for significant ROI
- Meta Data processing within camera / server or within Viewing management Software.
- In built and near-side analytics
- Remote Alarm Reporting
- Immediate indexing and playback of events.
- Intuitive Web page configuration common across all ranges.

What is NetVu Connected?

- Key Technology fundamentals -
  - NetVu Connected streaming formats in addition to simple RTSP IP streaming
    - RTSP support included for ONVIF interoperation
  - PAR file format video storage
  - MultiMode dynamic record and stream switching.
  - Embedded Meta data support and handling
  - Closed IP Hardened Management Layer to provide Discovery, auto configuration and network security.

NetVu Connected Streaming

- NetVu Connected streaming was developed before RTSP standard defined, and created specifically for the needs of Video Surveillance, rather than being derived from Web Media delivery protocols.
- Simple RTSP IP streaming is ‘Fire and Forget’ whereas NetVu Connected streaming is handshaked and error checked.
- Without error checking, damaged ‘difference images’ (P-Frames) can be lost, and then image corruption (‘splats’) will continue, typically on moving items, until the next ‘full image’ (I-Frames)
- Embedded Metadata in the headers stores Site-ID, Camera number and title, Lens format, embedded EPOS/ATM/Process data, Activity status, VMD status, and much more.
- Stream format can contain many different data blocks, video, audio, video sub images for analytics, debug and performance data etc.
- At the start of each stream parameters such as Lens format (for Immersive or alternative video layouts), analytics parameters, etc are included to ensure that the viewer displays the video with all functionality required. These are also provided in any recorded source.
- Extensible format means that further datablocks can be added with ease for future developments, but retain backwards compatibility

Remote Codec

- Simple IP Camera NVRs rely on RTSP streaming from the cameras to the NVR, typically over UDP
- No ability to flow control on UDP, or retry mechanisms, relying totally on available bandwidth and QoS. Errors or network congestion cause stuttering of images.
- Remote Codec technology optimises transfer on demand, with intelligent fast retries over either UDP or TCP
- Camera codec configured 'on demand' by NVR – no need to independently manage camera transmission rates
- NetVu Connected provides for up to three simultaneous profiles, but will also dynamically share streams to optimise Live Viewing and Recording when utilising the same profile.
- Due to greater stream flexibility and control, NVR requires less bandwidth, and so can be a more optimised, lower cost solution
- Results in much lower CPU loading providing for significantly lower power dissipation giving ‘Green Eco’ operation.

NetVu Video Partitions

- Immediate playback – multiple channels synchronised
- No need to download files before playback, Local, Remote or ARC
- Instant management review of an incident with Playlist support.
- Simple streams and their file containers, .ASF, .AVI, .MP4 etc were designed for media delivery, and therefore don’t support format changes on the fly.
- MultiMode dynamically manages resolution and rate, giving massive storage savings with 24/7 recording
- NetVu Video Partitions (PAR files) allow for all the additional data blocks and information from NetVu streams to be stored.
- Predefined at initial unit setup, PAR files do not modify the file system structure while writing, so a random power down does not result in a hard disk error requiring a SCANDISK or similar.
- Includes Event data so incidents within the file are easily reviewed, and all metadata with additional analytic streams.

MultiMode Storage Requirements

- IP Cameras Enable Hi definition – typically 1080P to 4MP or 4K
- 1080P 6x as many pixels as 4CIF, 12x compared to 2CIF
- 4MP 12x as many pixels as 4CIF, 24x compared to 2CIF
- Compression rates of 'bits per pixel' broadly consistent for any given Codec format
- Typical analogue requirement in 2CIF requiring 1TB storage, becomes a requirement for 12TB storage in 1080P, and 24TB of Storage for 4MP at same frame rates.
- Any increase in storage requirement typically increases download requirement as well.
- Dynamic management of record rates and resolutions essential to economically manage storage space.
- MultiMode switches resolution on any event – Activity, VMD, Alarm, Metadata etc
- Allows continuous 24/7 recording, with all key activity at highest resolution, not a compromise against storage limitations

MultiMode Example

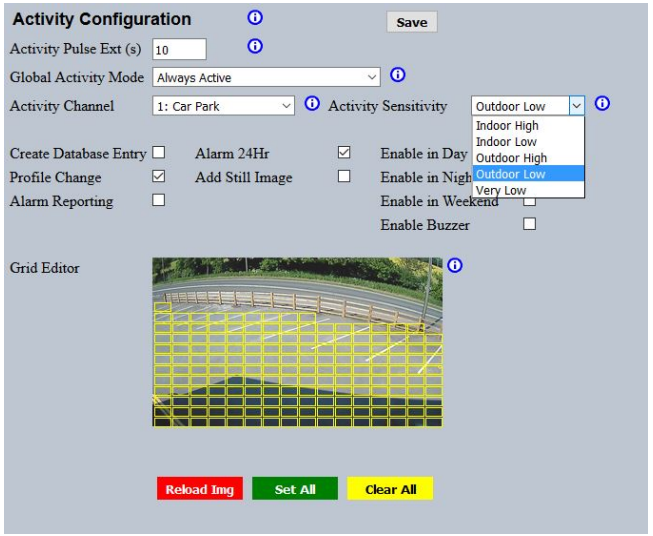
- Typical savings achieved using MultiMode
- Example assumes 20% (4.8 Hours / day) in Event, Contact, VMD or Activity

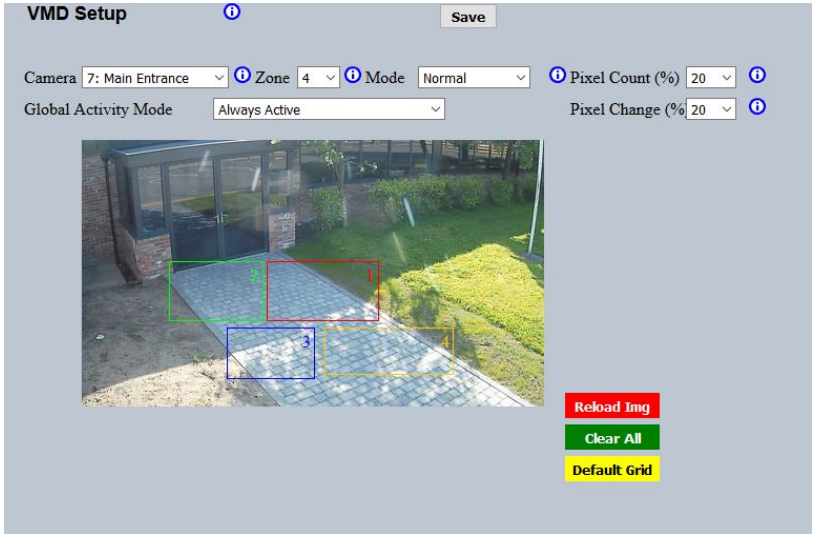
	Res	Brate	GB /day	Mmode	MM Total	Saving	Cams	Disc Requirement Days (TB)		
Normal	W288	200	2.1	1.7				**30**	**60**	**90**
Event	1080	1500	15.8	3.2	4.9	69.3%	16	2.33	4.66	6.99
	4MP	3000	31.6	6.3	8.0	74.7%	16	3.85	7.70	11.54
	8MP / 4K	6000	63.3	12.7	14.3	77.3%	16	6.89	13.77	20.66
Fixed	1080		15.8					7.59	15.19	22.78
	4MP		31.6					15.19	30.38	45.56
	8MP / 4K		63.3					30.38	60.75	91.13

- Normal resolution when no activity is better net picture quality than a previous analog system.
- At 4MP, 16 cameras, 60 days recording direct HDD cost saving over £1,000

MultiMode with VMD and Activity

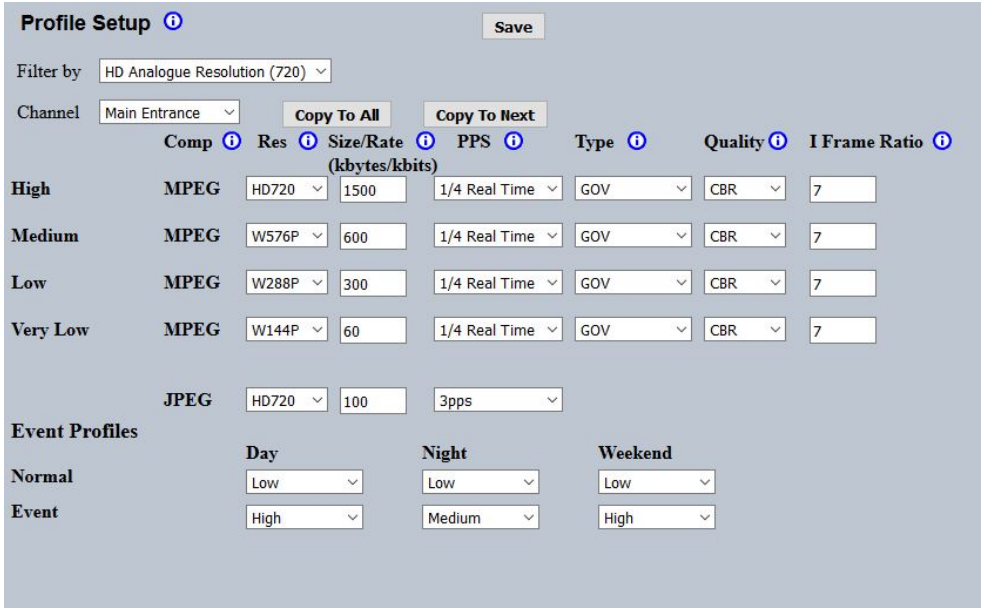
- Activity Detection to optimise Recording Profiles
  - Allows retrospective Activity search of any area
  - Cells have been disabled in this instance on roadway element to maximise Multimode saving
- VMD for specific Event detection and reporting - Define individual zones and sensitivity
  - Activate MultiMode, and also generate Database events typically for specific review





Multiple Profiles

- Multiple Profiles for Live Transmission and Recording



Embedded Meta data

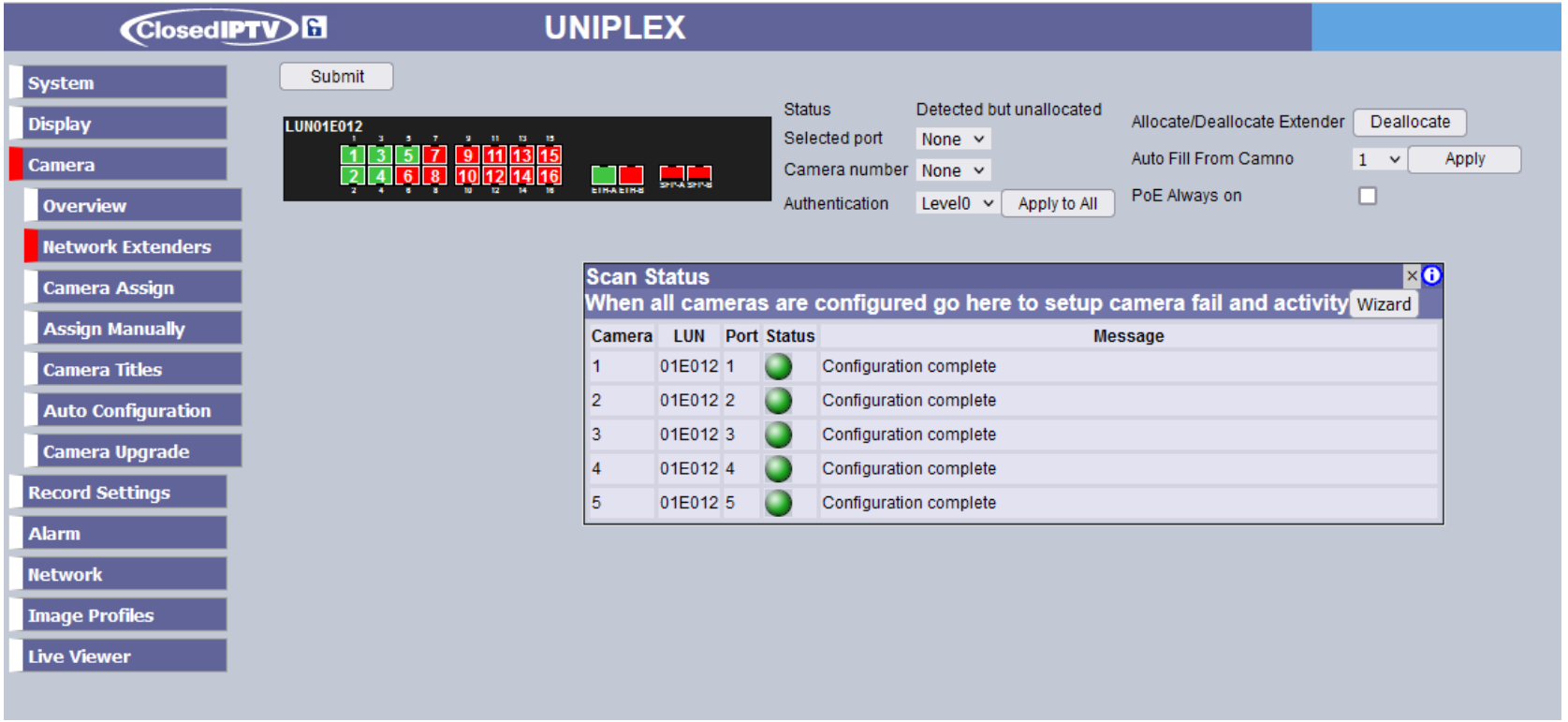
- Embedded meta data from many sources – typically EPOS / ATM in Retail applications, but can be from any source to create total PSIM solution.
- Onboard scripting can process realtime data, and generate event conditions, combined with simple VMD / Activity Detection or other Analytics.
- All data embedded within streams and also PAR files, with ability to retrospectively analyse using scripting in Enterprise Observer.

Closed IP Hardened Management Layer

- Automatic discovery of Closed IP compatible cameras without manually configuring IP addresses.
- Automatic ‘deterministic’ allocation of cameras to a specific camera number based on the physical port to which the camera is connected when used with NetVu Connected supported managed switches
- Automatic discovery of the ‘class’ of camera connected, allowing appropriate defaults settings to be configured and common settings updates.
- Automatic reconfiguration of a camera in a service event to either default or specific parameters previously assigned to that channel.
- Automatic firewall configuration, protecting external physical ports by MAC, Protocol and device identification (Trusted Endpoint).
- Automatic isolation by VLAN of cameras from User LAN/VLAN to protect from remote attack via a physical camera port, with access only via a secure proxy.
- Automatic discovery of peripheral features.

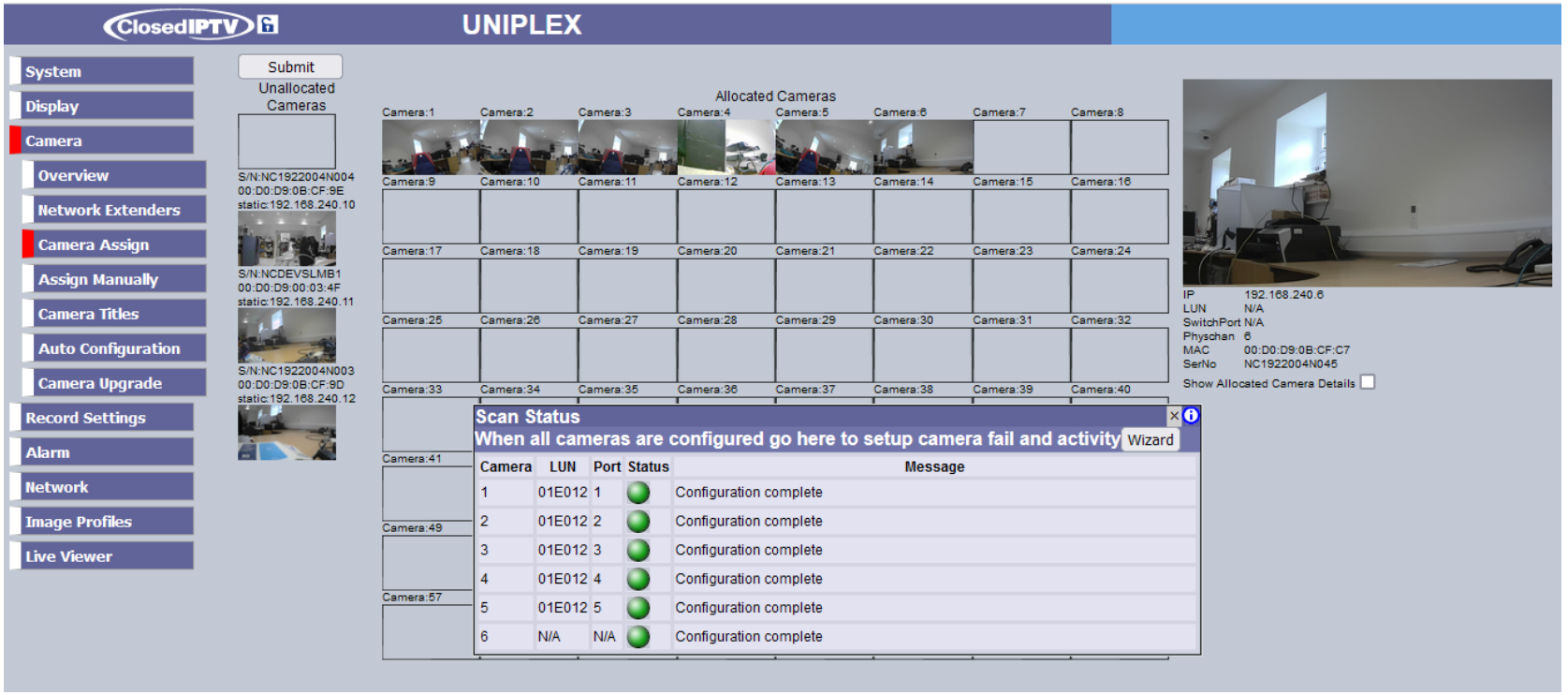
IP Allocation – Managed VLAN

- Cameras automatically configured to Static IP after discovery
- Allocation based on Port number and Switch config



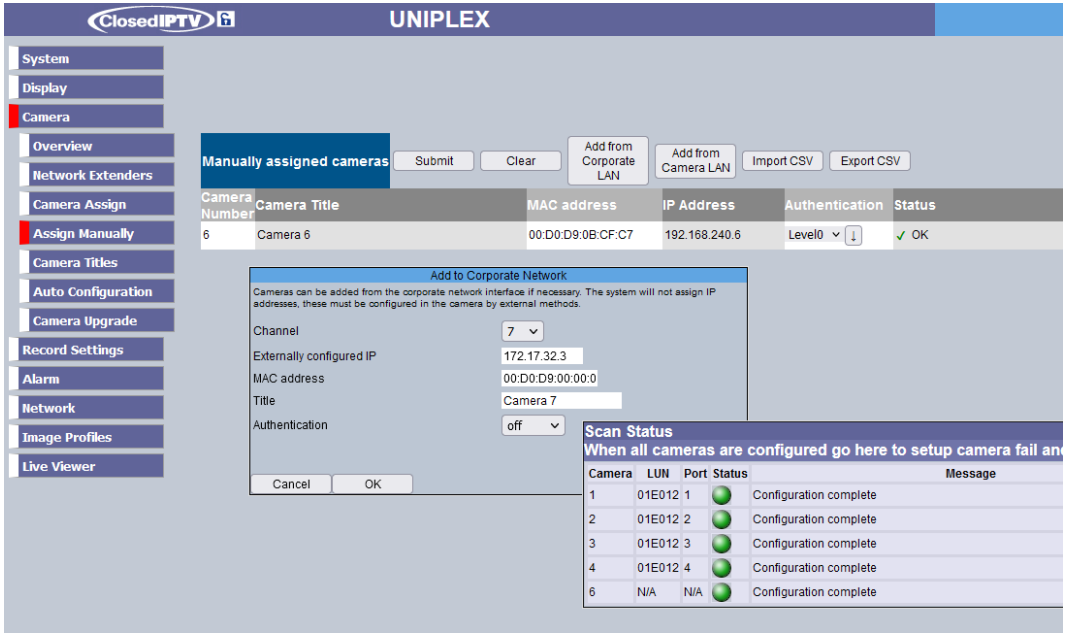
IP Allocation – unmanaged VLAN

- Cameras automatically configured to Static IP after discovery
- Easy drag and drop allocation



Manual IP Allocation

- Multiple Methods
  - Assign by MAC and channel on Camera VLAN
  - Assign by IP on external newtowork
  - Assign multiple devices including titles from CSV / Spreadsheet
- Cameras on segregated LAN automatically configured to Static IP after discovery
- Export of system configuration to CSV
- Cameras on external / Corporate network IP address allocation responsibility of installer / client.
- Automoatic unique passwords can be assigned to cameras.



Event handling

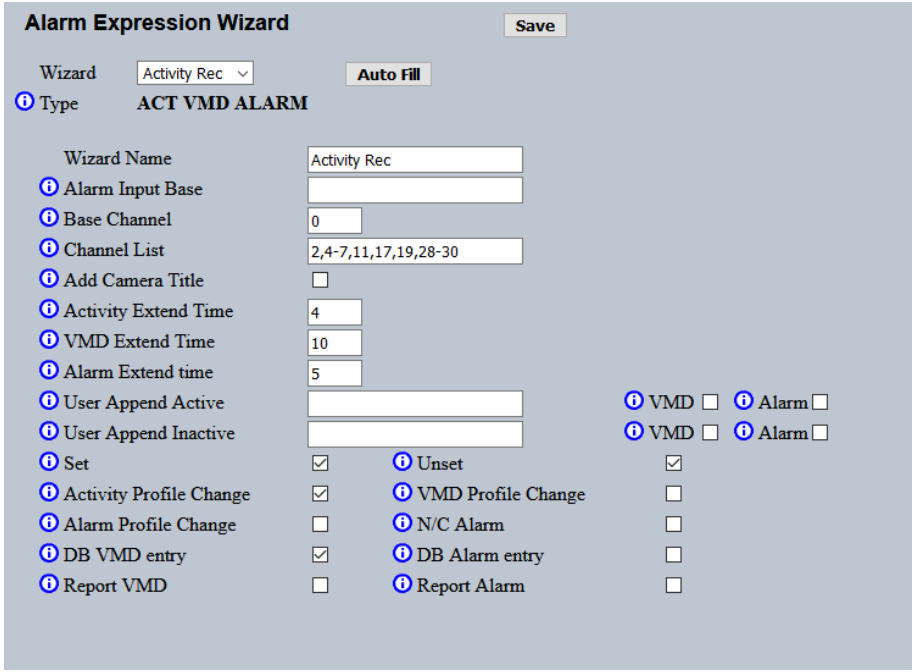
- Event handling on physical interfaces, meta data, and script driven.
- Easily Integrates alarms from many different sources
- Local Alarm contacts
- Camera Alarm Inputs – removes need for additional alarm modules etc. for door contacts etc.
- SIA / ContactID alarm panel integration for low cost intergation and expansion to BA and Access systems.
- ModBus and other IP peripherals
- Expression based evaluation allows for easy configuration of alarms from mixed sources

  ```
  LOCAL_INPUT[1] AND SET
  ```

  Completely configurable actions for both active and inactive states.
- Easy to use wizard, balances flexibility with 90% of complex applications fully GUI based with no manual coding of expressions
- PowerScript Modules for MQTT Integration

Expression Event Handler

Expression Wizard



Expressions generated

Expression Editor | Validate | Commit | Clear | Restore | Import | Export | Show Wizard expressions ☑

Expression	Actions (Active)	Actions (Inactive)
W_recAct_07 = ACTIVITY[7].EXTEND(4)	REC 7 E	REC 7 N
W_dbaseVMD_19 = VMD[19].EXTEND(10)	DBASE 19 VMD: 19	
W_recAct_30 = ACTIVITY[30].EXTEND(4)	REC 30 E	REC 30 N
W_dbaseVMD_11 = VMD[11].EXTEND(10)	DBASE 11 VMD: 11	
Red_Phone = LOCAL_ALARM_9	REP 9 Red Phone	
W_camFail_19 = CAMFAIL[19]	DBASE 19 Cam fail : Speedworks W_Shop	DBASE 19 Cam restore : Speedworks W_Shop
W_camFail_04 = CAMFAIL[4]	DBASE 4 Cam fail : TIGA FLHS	DBASE 4 Cam restore : TIGA FLHS
W_recAct_20 = ACTIVITY[20].EXTEND(3)	REC 20 E	REC 20 N
W_dbaseVMD_03 = VMD[3].EXTEND(10)	REC 3 E;DBASE 3 VMD: THF Small Gate	REC 3 N
W_dbaseVMD_17 = VMD[17].EXTEND(10)	DBASE 17 VMD: 17	
W_recAct_01 = ACTIVITY[1].EXTEND(3)	REC 1 E	REC 1 N
W_dbaseVMD_05 = VMD[5].EXTEND(10)	DBASE 5 VMD: 5	
W_dbaseVMD_18 = VMD[18].EXTEND(10)	REC 18 E;DBASE 18 VMD: Speedworks Entry	REC 18 N
W_recAct_02 = ACTIVITY[2].EXTEND(4)	REC 2 E	REC 2 N
W_camFail_17 = CAMFAIL[17]	DBASE 17 Cam fail : THF PTZ	DBASE 17 Cam restore : THF PTZ
W_recAct_29 = ACTIVITY[29].EXTEND(4)	REC 29 E	REC 29 N
W_camFail_02 = CAMFAIL[2]	DBASE 2 Cam fail : TIGA Side Entry	DBASE 2 Cam restore : TIGA Side Entry
camFail_30 = CAMFAIL[30]	DBASE 30 Cam fail: Important Camera	DBASE 30 Cam restore: THF Bottom Camera
W_camFail_18 = CAMFAIL[18]	DBASE 18 Cam fail : Speedworks Entry	DBASE 18 Cam restore : Speedworks Entry
W_camFail_07 = CAMFAIL[7]	DBASE 7 Cam fail : TIGA FishEye	DBASE 7 Cam restore : TIGA FishEye
W_recAct_19 = ACTIVITY[19].EXTEND(4)	REC 19 E	REC 19 N
W_dbaseVMD_04 = VMD[4].EXTEND(10)	DBASE 4 VMD: 4	
W_recAct_06 = ACTIVITY[6].EXTEND(4)	REC 6 E	REC 6 N
W_recAct_25 = ACTIVITY[25].EXTEND(3)	REC 25 E	REC 25 N
W_recAct_11 = ACTIVITY[11].EXTEND(4)	REC 11 E	REC 11 N
W_recAct_03 = ACTIVITY[3].EXTEND(3)	REC 3 E	REC 3 N
W_dbaseVMD_07 = VMD[7].EXTEND(10)	DBASE 7 VMD: 7	
W_recAct_05 = ACTIVITY[5].EXTEND(4)	REC 5 E	REC 5 N
W_camFail_06 = CAMFAIL[6]	DBASE 6 Cam fail : TIGA Rear	DBASE 6 Cam restore : TIGA Rear
W_camFail_11 = CAMFAIL[11]	DBASE 11 Cam fail : DEV 2.0 entrance	DBASE 11 Cam restore : DEV 2.0 entrance
W_dbaseVMD_02 = VMD[2].EXTEND(10)	DBASE 2 VMD: 2	
W_dbaseVMD_30 = VMD[30].EXTEND(10)	DBASE 30 VMD: 30	

PowerScript

- PowerScript - to enable the client to develop their own opportunities for significant ROI
- PowerScript is a powerful Javascript interpreter.
- Complex processing of metadata, and data from any other source including TCP and UDP data sources is possible, including ‘sniffing’ of EPOS and ATM data.
- PowerScript can also be used to create drivers of additional external devices, such as interfacing to Alarm panels and similar devices.
- A script can also be executed as a result of an event handler

EPOS and ATM Features

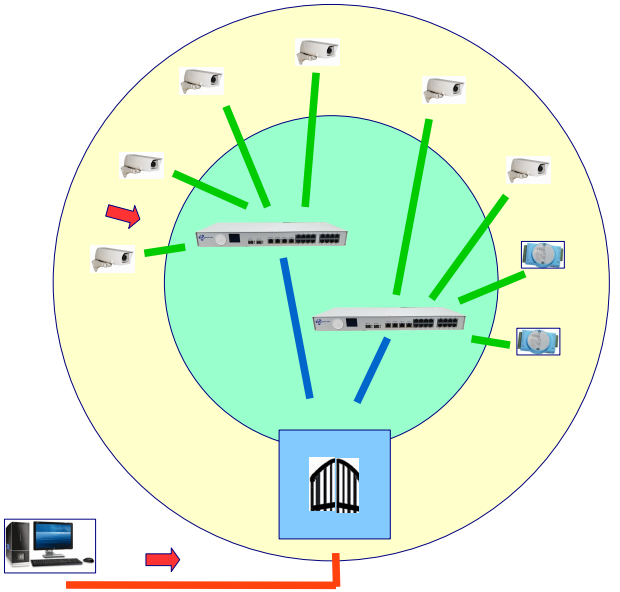
- EPOS meta data – Network sniffing, keyword detection
- Meta Data processing within camera / server or within Viewing management Software.
- Certain network ports can be configured to monitor specific IP addresses and/or MAC addresses, such that EPOS or ATM data can be extracted or ‘sniffed’.
- Specific ‘keywords’ can be detected to identify the start of a transaction, updating the Record Profile if required, and also if required more specific processing can be achieved by the utilisation of PowerScript to create more sophisticated fraud detection.

Analytics and Reporting

- In built and near-side analytics
  - Basic video analytics available within the product in addition to VMD, Activity detection etc. leveraging generic OpenCV AI datasets and methods.
  - With PowerScript it is possible to integrate with virtually any ‘near side’ server running a preferred analytic, and then combine the results with other conditions within the system.
- Remote Alarm Reporting
  - NetVu Connected products support a number of different remote reporting methodologies as a feature rich remote reporting method.
  - The Remote reporting feature provides for two independent hosts to send notifications to, via independent communication profiles.

Closed IP Network Security

- Closed IP hardened management layer provides unparalleled automatic security
- Protect Network from Attack
- Protect Cameras from Botnet attacks
- Segregated Camera VLAN
- Non routable camera network
- MAC Firewall
- Trusted Endpoint
- Restrict initiate comms from endpoint
- Integrated Firewalls
- Video gateway protected by viewing credentials
- Settings and admin protected by admin credentials
- No direct access to IP cameras and other peripherals



Uniplex Technology Sources

- Uniplex Range of NVRs
  - Hardware platform built around non Chinese DSP cores and processors – unparalleled backward compatibility and long term stable product support.
  - Firmware software suite evolved over 25 years, with robust data connections even over the most difficult comms links, even prior to the existence of the Internet as we know it.
  - NetVu Connected protocols give massive advantages over simplistic generic ‘Fire and Forget’ protocols such as RTSP
  - Closed IP management layer gives maximum Cyber security, both at physical network level, and also automated discovery and securing of data links and system level protection.
  - Not subject to generic Cyber Attacks such as Mirai, and other generic vulnerabilities exposed under many ONVIF implementations
- SmartVu camera firmware derived from long standing ‘NetVu Connected’ in-house core technology previously implemented on ChipWrights (Boston),Texas Instruments DSPs and now Sigmastar from Taiwan. Not reliant upon underlying software from Chinese Camera manufacturer.
- Meets the requirements of the John S. McCain National Defense Authorization Act under “For the purpose of public safety, security of Government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance”

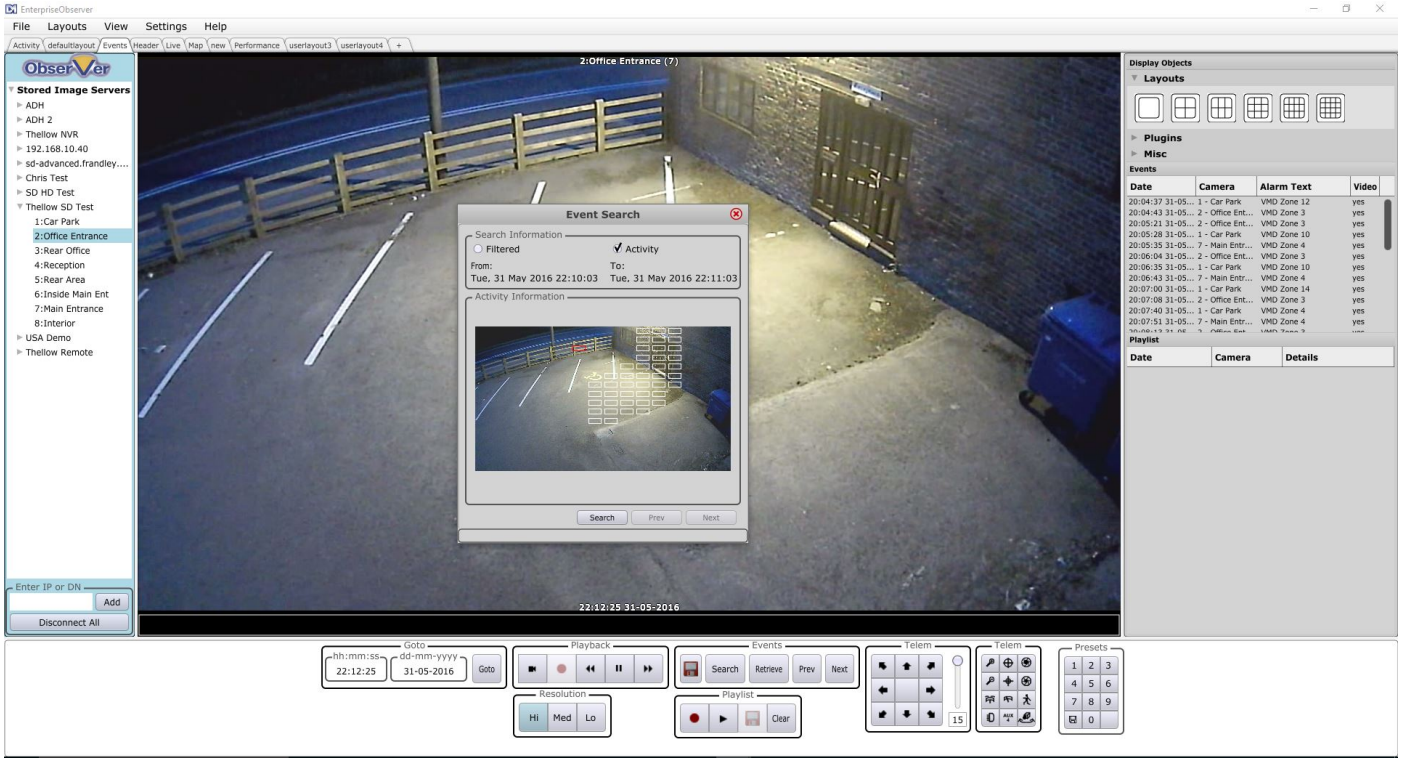
Onvif / PSIA IP Solution Comparison

- IP Cameras with PC Viewing stations
- Often only limited streams available for viewing, maybe alternative for recording
- Multiple single point failures to block system – expensive fail over server options etc.
- RTP / RTSP doesn't allow dynamic stream switching – all recordings at constant record rate – no polymorphic streaming
- Implementing secure network infrastructure often time consuming or cost prohibitive
- High level of IT knowledge required for install AND maintenance
- 'Internet Gateway' often a further discrete product, with many systems isolated from LAN / WAN due to security concerns.
- Generic interface and common codebase provides an easier path for hackers or exploits.

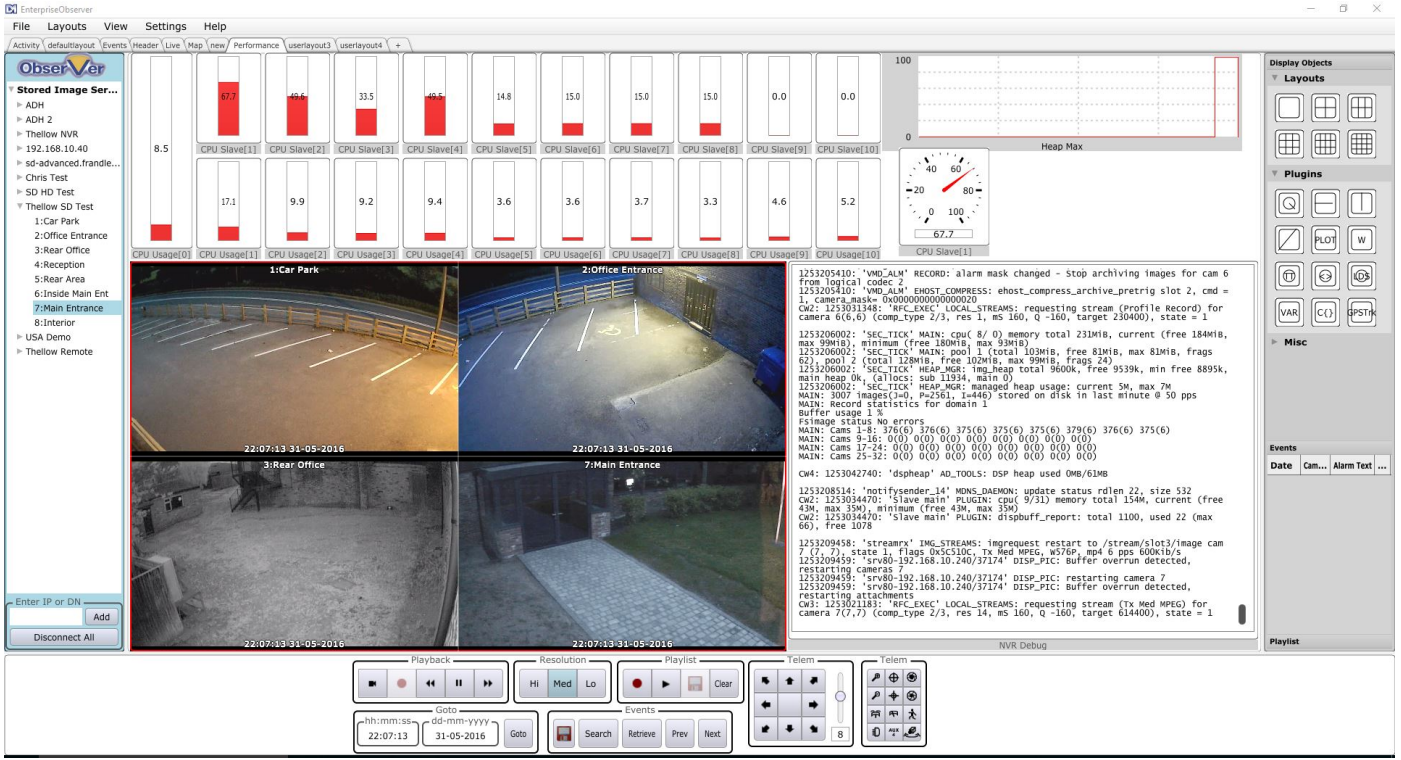
- Builds on highly regarded NetVu Observer
- Completely user definable worksheet layouts
- Multiple simultaneous window layouts
- Advanced Activity and Event Search
- User Playlists
- Multiple loadable PAR file sessions
- Simultaneous playback from multiple units in single window or multiple windows
- Powerful built in PowerScript and GUI data presentation

- Definable plugins for displaying system data and controls
  - Clickable Camera select maps
  - On screen ‘next camera’ arrows
  - Dials
  - Bar Gauges
  - Graph components
  - Status LED / Buttons
  - Text Variable display
  - Script IDE Editor and displayed Output
  - GPS Maps

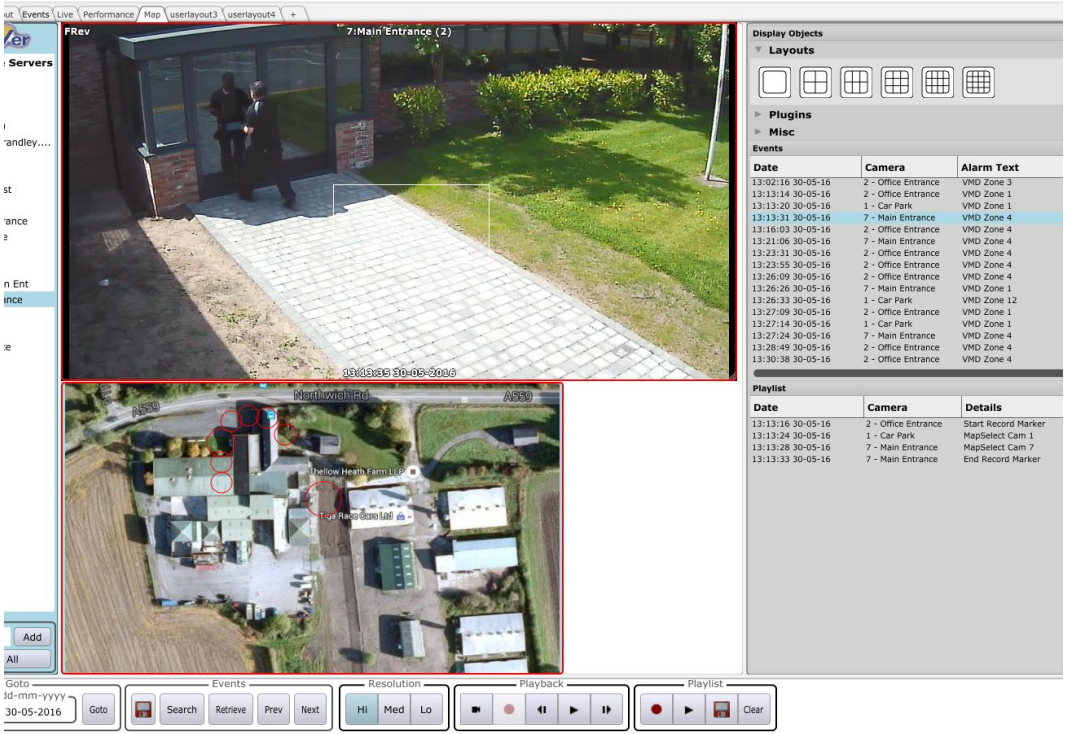
- Advanced Activity and Event Search



- Full integration of PSIM or Metadata



- Map Selection and Playlists



Decoder Operation

- Control from Enterprise Observer GUI
- Standalone Customer Monitor
- Advanced functionality from PowerScript
  - Customer Display activity overlays
  - Advertising Video Sequences
  - Emergency management Integration
  - Customer Announcements and Promotions