S-VMX VIDEO MANAGEMENT SYSTEM

Architectural & Engineering document

S-VMX 4.8 PRIME FEATURE OVERVIEW

TELESTE

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2 Introduction

This document describes the **Teleste S-VMX 4.8 Video Management System PRIME** intended for professional and enterprise-scale surveillance applications requiring live video monitoring, recording, playback, alarm handling, situational awareness and integration with external systems.

The purpose of this specification is to present the system scope, key capabilities, deployment principles and integration possibilities in a concise **Architectural & Engineering** format, suitable for tendering, system design and procurement activities in complex operational environments.

This document focuses on system-level functionality, operational behavior and architectural capabilities relevant to large-scale and multi-site deployments. Detailed device compatibility lists, low-level protocol specifics and implementation-level configuration options as well as more detailed information about functions and performance may be provided separately as appendices or project-specific documentation.

All equipment and materials shall be based on standard components that are regularly manufactured and utilized in the manufacturer's system.

All software and components shall be tested for system operation.

All equipment and components shall be **CE**-marked, **FCC**-compliant and certified for the intended operational environment.

The manufacturer's quality system shall comply with **ISO 9001** / **EN 29001** standards.

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3 System Overview

Teleste **S-VMX 4.8 PRIME** is a modular, distributed **video management system** designed for professional and enterprise-scale surveillance applications requiring live video monitoring, recording, playback, video distribution, system control and integration with third-party technologies. The platform is built to scale from localized installations to large, multi-site environments with thousands of video streams, while supporting centralized or distributed operation models.

S-VMX 4.8 PRIME enables operators to manage cameras, recorders, **video walls**, maps, alarms and associated system resources through a unified **user interface**. The system enables browser or client access, centralizes video and data management and supports smooth integration across local, remote, mobile and federated resources. Authorized access is governed by role-based permissions to support controlled, accountable operations in multi-operator environments.

The solution is intended for environments where operational continuity, scalability and integration flexibility are critical. **S-VMX 4.8 PRIME** supports resilient system architectures, including redundancy for selected server components, automatic restoration of video and data connections after restarts and failover behavior for supported server roles. The platform also supports continuity features for recoverable interruptions to help preserve monitoring and evidence-handling workflows. The system supports open integration through industry-standard interfaces such as **ONVIF**, **SNMP**, **OPC**, **LDAP**, **SAML**, **OpenID** and **Web API**, enabling coexistence with broader security, transportation and operational technology ecosystems. Where applicable, OPC UA is supported alongside OPC. For enterprise identity deployments, integration with external identity providers, including Microsoft Entra ID, is supported where applicable.

S-VMX 4.8 PRIME combines real-time video operations, recording and **evidence management**, **GIS**-based situational awareness, alarm handling, mobile and vehicle video integration, metadata handling and operator collaboration features into a single platform. This enables organizations to standardize surveillance operations while retaining the flexibility to adapt the system to project-specific workflows, deployment models and integration requirements. PRIME supports hierarchical **multi-level deployments** through federation and double federation, enabling building city-, regional- and national-level systems to interoperate under controlled access rights. The platform supports **fixed, mobile and offloaded recording workflows** and can represent dynamic objects such as **vehicles and trains on maps** with current or last-known location visualization. PRIME also includes centralized operational visibility capabilities, including performance and availability monitoring presented through dashboards and reporting for large-scale environments.

4 Core System Capabilities

4.1 Video Management

S-VMX 4.8 PRIME provides a unified operational environment for live viewing, **camera control**, recording access, **alarm handling**, map interaction and **video wall** operations. Operators can work with cameras, recorders, displays, maps and other system objects through tree views, maps, **drag and drop** operations and customizable layouts.

The system supports real-time visualization of video on local displays and video walls, with the ability to connect individual cameras or groups of cameras through direct operator actions. **S-VMX Client** supports live video, playback, digital zoom, snapshots, layout management and rapid switching between operational views. The **S-VMX Titanium Client** extends this with local file handling, **GPU-assisted decoding**, higher display density, **fisheye dewarping** and additional **evidence management** capabilities.

4.2 Scalable and Distributed Architecture

S-VMX 4.8 PRIME is based on a **distributed architecture** that supports a wide range of network topologies, from single-server systems to complex multi-server and multi-site enterprise deployments. The system is modular, allowing organizations to add or remove software components and system devices as operational requirements evolve across large-scale environments.

S-VMX 4.8 PRIME includes **federation capabilities** that allow multiple standalone **S-VMX systems** to be interconnected, including federation with selected third-party video management environments. PRIME supports federation and double federation for hierarchical multi-level deployments, enabling lower-level systems to operate as subsystems of higher-level systems under controlled access rights. The architecture supports multi-site and multi-operator enterprise environments in which access to shared resources is managed through **user rights** and **arbitration mechanisms**.

S-VMX 4.8 PRIME enables simultaneous operations from multiple control rooms while maintaining orderly and centralized control over shared resources such as **PTZ devices**, displays, video walls and **playback services** across federated and multi-site deployments.

4.3 Resilience and Operational Continuity

S-VMX 4.8 PRIME is designed to support operational continuity through **redundancy** of server components, automatic restoration of video and data connections after restarts and automatic switching of clients between multiple servers when supported backup resources are available.

S-VMX 4.8 PRIME deployments can also provide centralized **performance monitoring** with **dashboards** for operational visibility across key system components. The system supports recovery of interrupted operational video and recording paths after recoverable connection disturbances, helping maintain continuity of monitoring, display workflows and evidence capture with minimal operator intervention in enterprise and mission-critical environments.

4.4 Operator Efficiency and Situational Awareness

The system provides a rich operator environment that combines live video, playback, different types of maps (static, offline GIS, online GIS) including object real-time location, alarms, object search, **PTZ control**, layouts, scenarios and collaboration tools. **User interface** capabilities help operators access information quickly and adapt the workspace to their operational roles.

S-VMX 4.8 PRIME also supports operations based on **scenarios**, allowing predefined or ad-hoc video switching sequences to be executed on local displays or **video walls**. In addition, **GIS** functions, **alarm scenarios**, recent alarms, **maintenance mode** indicators and object status visualization help operators maintain situational awareness across large-scale, complex and multi-site surveillance environments.

4.5 Security, Access Control and Auditability

S-VMX 4.8 PRIME supports multiple **authentication** approaches and comprehensive **role-based access control** to system objects and functions. This includes configurable **password policies**, camera access modes such as public and private, advanced **session control** and detailed **audit logging** of operator and system activities across large-scale environments.

The system also supports secure communication and security functions, protected recordings and detailed logging of operations such as login, logout, snapshots, playback, downloads, object control, alarm handling and configuration changes. The system supports encryption and integrity protection for recordings and exported material, including encrypted downloads and checksum-based integrity verification. This helps organizations support operational accountability and basic evidence handling requirements.

S-VMX 4.8 PRIME provides centralized activity logging of system and operator actions. In PRIME deployments, the log service can be hosted on a dedicated **Log Server** to support scalable log handling, controlled access to log data and efficient search and export of activity records for audit and operational oversight purposes.

4.6 Performance Monitoring

S-VMX 4.8 PRIME provides centralized **performance monitoring** and dashboards for operational visibility across key system components. Monitoring can include servers, client workstations and Video Wall units, with optional **notifications** when defined thresholds are exceeded.

5 Typical Deployment Scenarios

5.1 Multi-Site Surveillance and Control Rooms

S-VMX 4.8 PRIME is suited for deployments in which surveillance operations are distributed across several sites but must be managed from a unified operational environment. The platform supports geographically distributed, multi operator environments, **federation** between standalone **S-VMX systems** and selected third-party federation scenarios. Operators can access live video, playback, **PTZ** functions, alarms and maps across interconnected environments while preserving central control logic and access rights.

This model works well for control rooms, regional supervision and operational centers that manage video resources across multiple sites using a single interface.

5.2 Transportation and Mobile Operations

S-VMX 4.8 PRIME supports transportation and mobile surveillance scenarios through dedicated support for mobile gateways, mobile video streaming, NVR installations on vehicles, GPS presentation on maps and mobile/offloaded recording workflows. The system supports mobile NVRs used in cars, buses and trains and allows live access, playback, metadata access and download when communication paths are available. It also supports video offload workflows and historical vehicle road presentation on maps.

The platform further supports body worn and mobile camera integrations. This makes S-VMX 4.8 suitable for operations where fixed, mobile and personnel-carried video sources must be combined into one surveillance environment.

5.3 GIS and Location Based Operations

S-VMX 4.8 PRIME supports deployments in which situational awareness depends on maps, georeferenced assets and workflows based on location. The system offers comprehensive support for geographic and static image mapping, including map layers, object positioning, camera cones, dynamic mobile objects, GIS search capabilities, zooming and navigation. Route management features are available and depend on the selected map provider. The system integrates with leading services such as OpenStreetMap, Google Maps, Bing Maps, WMS and Esri GIS.

This makes the system suitable for environments where operators must quickly understand where an event occurred, locate the nearest cameras, follow mobile objects, visualize geographical groupings or execute **map-based camera selection** and **monitoring workflows**.

5.4 Operations Based on Alarms and Incident Response

S-VMX 4.8 PRIME is suited for environments in which operators must respond to alarms, incidents or operational events in real time. The system supports **alarm distribution**, **alarm scenarios**, **alarm search**, **alarm grouping**, **recent alarm views**, actions triggered by events and workflows that allow operators to move directly from an event to live or recorded video. It also supports **maintenance mode (indicating devices are temporarily out of operation) and emergency mode (ensuring protection of recordings)**, **activity logs**, helping teams manage incidents while maintaining operational traceability.

This operating model is appropriate for **public space surveillance**, **transportation operations**, **infrastructure monitoring** and other control environments where **alarms**, **device states** and **operator actions** need to be correlated quickly and consistently.

5.5 Environments Focused on Integration

S-VMX 4.8 PRIME supports operational environments where the surveillance system must act as part of a broader ecosystem rather than as a standalone **VMS**: such as GIS, analytics, public announcement systems, intelligent transportation systems, nurse call systems, airport baggage handling systems, passenger information systems, external identity systems and selected third-party video platforms.

This makes the platform appropriate for projects in which surveillance, operational events, external alarms, **metadata**, location data and **enterprise identity services** must be combined into one integrated operating environment.

6 Core Features

6.1 Live Monitoring and Operator Control

S-VMX 4.8 PRIME provides operators with live video monitoring through **browser-based client**, **Titanium Client**, **video wall** and **mobile client** interfaces. Operators can connect video from selected cameras to local displays or video walls, switch between live and playback modes, manage multi-display layouts, use full-screen views and move video between displays. The **Titanium Client** supports dense display layouts up to 64 windows and high-resolution decoding, including support for **4K** and even higher resolution cameras. Video connections can be initiated both by direct operator actions and by alarm or scenario-driven workflows, enabling rapid presentation of relevant streams during incidents.

The platform supports multiple methods of **PTZ** control, including **hardware joystick**, mouse-based virtual joystick, workstation keyboard, on-screen controls, preset control and activation of supported camera accessories such as washer, wiper and lighting functions. For supported deployments, **PTZ** control is also available in **federated environments** and on **mobile interfaces**. Within federated deployments, authorized users can control PTZ cameras across system boundaries in accordance with defined access rights and operational priorities.

Operators can personalize layouts, apply filters in camera and recorder trees, use favorites, search for system objects, manage widgets and adjust user settings such as aspect ratio behavior, unicast preferences, keyboard PTZ control and interface language. The **S-VMX** user interface can be presented in the following languages: English, Finnish, French, German, Polish, Swedish, Hungarian, Spanish, Slovenian, Bulgarian and Romanian.

The user interface is intended to support both everyday monitoring and high-tempo operational situations.

6.2 Playback, Search and Evidence Handling

S-VMX 4.8 PRIME provides built-in tools for searching and playing back recordings using its browser-based interface. Users can filter recordings by a variety of criteria, including camera, recorder, time, metadata, description, alarms, comments, location and protection status.

Playback can be carried out at normal speed, fast-forwarded or reversed, viewed frame-by-frame, navigated directly by entering a specific time, previewed on a timeline or synchronized across multiple recordings within the **S-VMX Titanium Client**. Recordings are accessible locally, can be shown on video walls, downloaded, exported to USB or exported to **NAS** using specialized workflows. In the event of a recoverable connection interruption during a download operation, the client supports retry of the download process once the connection is restored.
PRIME supports mass extraction of selected recorded material directly from recorders to a target NAS, with operator visibility of extraction status and restart capability and storage organization aligned with ISO 22311 first-level hierarchy.

For evidence management, the system supports **tagging**, protected recordings, **emergency mode**, **snapshots**, **file export**, local download management and **verification** through **signatures** and **audits**. Operators can create protected recordings, add labels or comments and perform searches based on criteria. PRIME supports evidence handling across fixed, offload and mobile recording environments, enabling operators to access recordings originating from standard NVRs, Offload NVRs and mobile NVRs through a unified operational workflow, subject to access rights.

6.3 Alarm and Incident Handling

S-VMX 4.8 PRIME provides centralized alarm handling for internal and external sources, displaying severity, description, device, timestamps and state. Operators can search alarms by device, code, time or state and export results to **CSV** or **PDF**. Alarm scenarios trigger actions like map zoom, video connection, sound playback, highlighting and full-screen activation. Operators can acknowledge, group, change alarm states and request recordings based on alarm time for efficient response. The platform also features recent alarms views, maintenance indicators, filters, outputs and customizable distribution to avoid event overload and ensure critical alarms remain actionable. In federated deployments, PRIME supports controlled forwarding of selected alarms to upper-level systems to support coordinated multi-level incident response.

6.4 GIS and Location Awareness

GIS is a core operational capability in **S-VMX 4.8 PRIME**. Operators can use geographical maps or static maps, switch between **map layers**, navigate map hierarchies, locate devices on maps, manage camera objects and work with dynamic and static location objects. Supported functions include map navigation, layer visibility control, **lasso selection**, **magnet link tools**, object grouping, map search, default map handling and presentation of **camera direction** and **zoom** information on maps.

The system supports mobile and dynamic location objects, including **Android-based** mobile devices with **Teleste MCAM** and mobile cameras transmitting live **GPS** data in **NMEA** format. This allows operators to combine fixed surveillance infrastructure with moving resources within the same map-based operational view. PRIME supports representation of vehicles and trains as dynamic map objects, including visualization based on current GPS location and last-known location when the mobile system is not actively transmitting.

GIS functionality is also used as part of **alarm** and **response workflows**, helping operators locate the source of an incident, quickly identify associated cameras and transition from a **location view** to **live** or **recorded video**.

6.5 Operator Collaboration and Workflow Support

S-VMX 4.8 PRIME includes functions that support operator coordination and daily operational workflows. **Instant messaging** enables operators to exchange text messages, transfer video links, request camera unlock actions and view availability status of other operators. **Activity logs** provide searchable records of operator actions and system actions, helping supervisors and administrators maintain operational oversight.

The chat tool supports sharing of snapshots and sharing of GPS coordinates as map links to provide rapid operational context between operators, including across system boundaries in federated deployments.

The system also supports quick launch functions, user-specific layouts, scenario execution, maintenance mode, session control and detailed status presentation for devices and system objects. Together, these features help teams work efficiently in shared control environments where speed, visibility and traceability are important.

7 Operational Environment Overview

Detailed device and protocol compatibility information is provided in the S-VMX Interfaces Support Appendix.

7.1 Video Sources, Devices and Standards

S-VMX 4.8 PRIME supports a broad range of video sources and device types, including **ONVIF**-compliant cameras, generic **RTSP** devices, vendor-specific **IP** cameras, IP encoders and decoders, multisensor cameras and selected third-party platforms. The system operates as an ONVIF client and supports **ONVIF Profiles S**, **G**, **T** and **M**, enabling access to device recordings, metadata handling and limited configuration exchange for supported device classes.

For browser-based clients, **S-VMX 4.8 PRIME** delivers video streams using modern web technologies, preserving native frame rate and resolution without requiring transcoding. When video encoding formats are not supported by **MSE** or **WebRTC**, video content can be provided as transcoded **JPEG** streams, ensuring broad compatibility across client environments.

S-VMX 4.8 PRIME supports **multistreaming**, **stream multiplication** and **stream reflection** capabilities that enable efficient reuse and distribution of live video streams to multiple operator workstations, video walls and operational workflows. These functions allow a single incoming video stream to be reflected or shared across multiple viewing and processing contexts without requiring multiple direct connections to the original source, supporting scalable monitoring operations and optimized use of network resources.

7.2 Analytics and Metadata

S-VMX 4.8 PRIME supports video analytics integrations both from server-based analytics systems and from compatible encoders or cameras that provide analytics events or metadata. It also includes analytics-related alarm handling, video diagnostics, metadata ingestion and integration with third-party analytics environments.

The platform also supports 3rd party **ANPR/LPR** and **face recognition** integrations with **metadata ingestion** and **real-time metadata preview widgets**, filtering, search, snapshot presentation and correlation with stored video. Operators can search for metadata using fields such as date/time, device name, identifiers, snapshot preview and additional vendor-specific attributes when provided by the connected system.

7.3 Mobile, Body-Worn and Vehicle Video

S-VMX 4.8 PRIME supports mobile and body-worn video workflows through integrations such as **Teleste MCAM 2** or 3rd party products. The system supports live viewing, recording, metadata handling, map presentation and, where applicable, offload workflows into central S-VMX environments.

S-VMX 4.8 PRIME supports offload recording workflows using Offload NVR environments, including offloading recordings from supported body cameras and mobile recording devices. System also supports manual upload of recordings to Offload NVR environments where required by operational workflows.

In addition, S-VMX 4.8 PRIME supports dedicated mobile **NVR** workflows for vehicles such as cars, buses and trains. These workflows include live video access, playback, metadata access, on-demand download, **Wi-Fi offload**, **external-drive offload** support, map-based positioning and centralized management of users, software and configuration updates for connected mobile units.

7.4 External Systems and Operational Interfaces

S-VMX 4.8 PRIME is designed to operate as part of a wider operational environment for public announcement systems, intelligent transportation systems, nurse call systems, airport baggage handling systems, passenger information systems and external event environments using protocols such as OPC, SNMP and dedicated vendor interfaces.

The system supports **third-party VMS integration** scenarios. In addition, **S-VMX 4.8 PRIME** provides an integrated **Web API** for third-party client application integration, helping organizations connect the video management environment with broader operational and enterprise systems.

S-VMX 4.8 PRIME supports **ONVIF Gateway**, a licensed add-on module used to provide live and playback video streams from the Teleste S-VMX system to third-party systems. Video distribution and interoperability with external systems are supported through defined interfaces and system components, without exposing internal S-VMX control logic or user management outside.

S-VMX 4.8 PRIME supports **Command & Capture** functionality, extending integration beyond video sources. This functionality enables users to observe, record and remotely manage external computer desktops within the **S-VMX** environment. Desktop displays are captured as video sources for purposes of display, recording, search and replay alongside other video streams. Where permitted, operators may interact with external systems via the S-VMX Client, thereby enhancing the efficiency of operational tasks that involve third-party applications.

8 Client Applications and User Access

8.1 Web Client

S-VMX 4.8 PRIME provides a browser-based Web Client that enables users to access core video management functionality without the need for local software installation. The S-VMX Web Client is designed for operational flexibility, allowing authorized users to connect from standard workstations within secured networks or approved remote environments.

Through the S-VMX **Web Client**, operators can:

- Monitor live video streams
- Access recorded video
- Control **cameras**
- Work with **alarms** and **events**
- Use GIS maps and system object trees

The **S-VMX Web Client** supports **role-based access control** and user-specific layouts, ensuring that each operator sees only the functionality and system objects relevant to their operational role. This makes the S-VMX Web Client suitable for daily monitoring tasks, supervision roles and environments where rapid workstation deployment is required.

8.2 Titanium Client

The **S-VMX Titanium Client** is an installable, high-performance workstation client designed for **control rooms** and operator stations requiring advanced video handling and local resource utilization. The S-VMX Titanium Client is based on the Chromium engine, supporting a secure and modern client environment for video management operations.

In addition to all S-VMX Web Client capabilities, the S-VMX Titanium Client provides:

- Support for flexible video layouts with multiple simultaneous video streams
- Hardware-accelerated video decoding using **GPU** resources
- Support for high-resolution and **multi-sensor cameras**
- **Local file management** for downloaded video and snapshots
- **Evidence handling** functions including local verification and export
- Advanced playback and synchronized multi-camera review
- Fisheye camera dewarping and **virtual PTZ** functionality

The S-VMX Titanium Client supports multi-monitor workstations and is optimized for continuous operation in critical environments such as traffic control centers, public safety operations and transportation monitoring facilities. Centralized client update mechanisms allow administrators to manage workstation software versions consistently across the deployment.

8.3 Mobile Client Access and Mobility

S-VMX 4.8 PRIME supports access from **mobile devices** such as smartphones and tablets through a mobile-optimized **Web Client** interface. The mobile interface adapts automatically to the detected screen size and device type, providing appropriate user experience for field and supervisory personnel.

S-VMX Mobility enables authorized users to:

- View live video streams
- Access recorded video
- Navigate **maps** and **locations**
- Receive alarms and notifications
- Control **PTZ** cameras (where permitted)

This functionality supports operational scenarios where video access is required outside traditional control rooms, such as on-site supervision, mobile incident response or management oversight.

In S-VMX 4.8 PRIME deployments, touch-optimized operation can provide dedicated views for Video, Map and Chat and can include Offload-related workflows where deployed.
Where location sharing is enabled, mobile collaboration can include sharing GPS location information as map links via the integrated chat tool.

8.4 User Authentication and Session Management

S-VMX 4.8 PRIME supports multiple authentication models, including native S-VMX user management, **LDAP** integration and single sign-on using **SAML** or **OpenID**. For enterprise identity environments, this may include **Microsoft Active Directory** and **Microsoft Entra ID** in applicable deployment scenarios.

Only one **authentication method** is active at a time, simplifying operational management. Regardless of the authentication method used, video access rights, object permissions and operational roles are managed within the **S-VMX system**.

The platform supports **secure session handling**, configurable **session timeouts**, controlled session transfers and **audit logging** of login and logout events. This ensures that access to the system remains controlled and traceable in shared operational environments.

9 Recording, Playback and Evidence Management

9.1 Video Recording

S-VMX 4.8 PRIME supports centralized and distributed video recording using dedicated network video recorders (**NVRs**), including support for fixed, mobile and offloaded recording environments. Recording can be continuous, event-based or triggered by alarms and external events, depending on system configuration.

The system supports **loop recording** as well as **protected (permanent) recordings**, ensuring that critical video evidence is preserved and not overwritten. Recording operations are transparent to operators, allowing them to focus on monitoring and response rather than storage management.

9.2 Recording Search and Playback

Operators can search for **recorded video** using multiple criteria, including:

- Camera or recorder selection
- Time and date range
- Alarms and events
- Operator comments and tags
- Protected recording status
- Metadata types (e.g. analytics, ANPR, face recognition) – metadata / video correlation in dedicated widget
- Geographical area (map-based search)

Playback functionality includes normal playback, fast forward and reverse, frame-by-frame navigation and direct time navigation. When using the S-VMX Titanium Client, synchronized playback of multiple cameras is supported, enabling effective investigation of incidents captured from different viewpoints. Playback can be performed on local displays or video walls, allowing teams to review incidents collaboratively in control room environments.

9.3 Evidence Protection and Export

S-VMX 4.8 PRIME provides comprehensive tools for evidence handling, including:

- Creation of **video tags** and operator comments
- **Protected recordings** that prevent overwriting
- **Emergency mode** to preserve recordings across selected system objects
- Snapshot creation and management
- Controlled download of recorded material to local workstations or NAS systems
- Recordings export

Exported video can include audit information and verification data to support evidence integrity. Access to export functions is controlled by user rights, ensuring that only authorized personnel can retrieve or distribute recorded material.

9.4 Audit Trail and Activity Logging

All critical system and operator actions are logged within S-VMX 4.8 PRIME. This includes:

- User authentication events
- Camera and device control actions
- Playback and download operations
- Alarm handling
- Configuration changes

Logs can be searched and exported for operational review, compliance or forensic purposes. This audit capability supports accountability and traceability in regulated or high-security environments.

10 Alarm Handling and Incident Response

10.1 Alarm Sources and Distribution

S-VMX 4.8 PRIME supports alarms generated by:

- Internal system components
- Cameras and encoders
- I/O devices
- External systems via supported interfaces (e.g. SNMP, OPC, Web API)

Alarms are **distributed centrally** and presented to operators with information such as severity, source, description, timestamps and current state. Alarm filtering mechanisms can be applied to reduce noise and ensure that only stable and relevant alarms are presented to operators. In federated deployments, S-VMX PRIME supports controlled forwarding of selected alarms to upper-level systems to enable coordinated multi-level operations.

10.2 Alarm Visualization and Workflows

Incoming alarms can trigger predefined alarm scenarios that **automatically adjust the operator interface.** These scenarios may include:

- Automatic video connection
- Map zoom and object highlighting
- Display activation on local client (live or playback)
- Visual and audible notifications
- Widget with selected Video Wall loaded

Operators can acknowledge alarms, group related alarms and track alarm states such as active, observed and closed. Alarm lists support sorting, filtering and search functions to help operators manage high event volumes during peak operational periods.

10.3 Incident Investigation and Resolution

From an alarm or event, operators can **directly access** associated live or recorded video. Drag-and-drop workflows allow rapid transition from alarm lists to playback or live monitoring.

Alarm data and related recordings can be **exported** for reporting or further analysis. This integrated approach supports efficient incident response, investigation and documentation within a single system environment.

11 GIS, Maps and Situational Awareness

11.1 Map Operations

S-VMX 4.8 PRIME includes integrated GIS functionality that allows operators to work with both geographical maps and static site plans. Maps can be organized **hierarchically** and presented with **multiple layers**, enabling clear visualization of cameras, alarms, devices and other system objects.

Operators can:

- Navigate maps and layers
- Locate devices and alarms
- Visualize camera orientation and coverage
- Use map-based selection tools to connect video
- Switch between different map providers and views
- Perform address searches on maps also when offline maps are used and no internet connection is available.
- Measure distances and use multi-selection tools (e.g. lasso/rectangle) for efficient camera selection and video connection workflows
- visualize map objects (e.g. cameras, vehicles) grouped by zoom level, ensuring clear and scalable map views

11.2 Mobile and Dynamic Objects

The system supports **dynamic objects on maps**, including mobile cameras, vehicle NVRs and mobile streaming devices with **GPS** positioning. Locations are updated automatically based on received GPS data, allowing operators to track moving assets in real time. S-VMX 4.8 PRIME supports visualization of **vehicles and trains as map** objects based on their GPS coordinates and can present last-known location information when the in-vehicle system is not transmitting.

This functionality is particularly relevant for **transportation systems, mobile surveillance and field operations** where situational awareness depends on both fixed and moving resources.

11.3 GIS Incident Response

Maps play a key role in alarm and incident workflows. When alarms occur, operators can immediately visualize the affected location, identify nearby cameras and initiate live viewing or playback directly from the map interface.

This reduces response time and improves situational understanding during incidents, especially in large or geographically distributed deployments.

12 Deployment, Architecture Overview and Extensibility

12.1 Deployment Models

S-VMX 4.8 PRIME supports **flexible deployment models**, including:

- Single-site installations
- Distributed multi-server environments
- Multi-site and federated systems
- Hybrid environments with fixed and mobile components
- Hierarchical multi-level federated deployments supporting federation and double federation, enabling building/city, regional and national operational models.

The modular architecture allows system components to be deployed and **scaled according to project requirements** without redesigning the entire system.

12.2 High Level System Architecture

At a high level, S-VMX 4.8 PRIME is based on a distributed client-server architecture. Scalable and resilient operation is supported through distributed architecture mechanisms, including a **load balancer and failover server** for selected system components as well as **failover NVR** to maintain service continuity during component failure or restart. Core system services manage device control, video distribution, recording, metadata, alarms and user access. Clients connect to these services to provide live monitoring, playback and control.
S-VMX 4.8 PRIME supports unified operation across multiple recording environments, including standard NVRs, Offload NVRs and mobile NVRs, subject to user rights. Deployments may include dedicated gateway roles to **support federation between systems** and integration of mobile recording environments.

12.3 Integration and Extensibility

S-VMX 4.8 PRIME is designed as an open platform that can be integrated with external systems and extended as operational needs evolve. Integration is supported through:

- Open standards such as ONVIF, SNMP, OPC, LDAP, SAML and OpenID
- Dedicated Web API interfaces
- Support for third-party analytics and metadata sources
- Federation with selected external video management platforms

This extensibility enables S-VMX 4.8 PRIME to operate as part of a broader operational environment rather than as an isolated surveillance solution.

13 Secure Communication and Cybersecurity

The S-VMX 4.8 PRIME system is designed to protect system integrity, video data and operational resources by applying security mechanisms across communication, storage, access control and auditing domains.

13.1 Secure Communication

The S-VMX 4.8 PRIME system supports secure communication between all system components, including access from **S-VMX Client** applications.

All supported communication channels are secured using industry-standard cryptographic protocols based on latest **TLS/SSL**. The system also supports secure video streaming from video sources using **RTSP/RTP/TCP** over **HTTPS**. For federated and external streaming scenarios, **RTSP interleaved over TLS or RTSP/RTP/TCP** over **HTTPS** is supported where configured.

13.2 Video Data Protection

The S-VMX 4.8 PRIME system includes mechanisms to protect stored video data against tampering, unauthorized modification or fraudulent actions.

Video recordings stored on Network Video Recorders (NVRs) are protected using **AES-256 encryption**, ensuring confidentiality of recorded data at rest. When video material is exported from NVRs, the system supports **password-protected encryption** of exported video files.

The S-VMX 4.8 PRIME system ensures exported video integrity with **XAdES digital signatures**. When extracting video, a separate XAdES signature file is created for each recording, available after download and accessible via the same authenticated session. Signatures can later be verified using standard XAdES rules to support compliance and forensic validation.

13.3 Access Control, Password Management and Auditing

The S-VMX 4.8 PRIME system supports comprehensive **access control and auditability** to enable traceability of operational actions and to support audit, compliance and forensic review requirements. The system provides configurable **password policy** rules and detailed **logging of system and user activities**. User-specific security reports can be provided, including information such as first login, last login and password age.

14 Legal Declarations

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Teleste reserves the right to make changes to any of the products described in this document without notice and all specifications are subject to change without notice. Current product specifications are stated in the latest versions of detailed product specifications.

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