# Intelligent Video Surveillance Solutions

May 2010

# MindTree Solutions for Video Surveillance

- Largest portfolio of Ready-to-Brand licensable components that enable OEMs and system integrators to introduce their own products

- Committed & Sustained Roadmap

- Multiple Licensees

- 3 Patent Applications*

- Member of Open Network Video Interface Forum and Physical Security Interoperability Alliance

*Patent Process  In progress

# Intelligent Video Surveillance System



Mind Tree Components

"Intelligent" Digital Video Encoder

Hybrid DVR

Digital Video Decoder

Network Video Recorder

Surveillance (VMS) Manager

Video Analytics Server
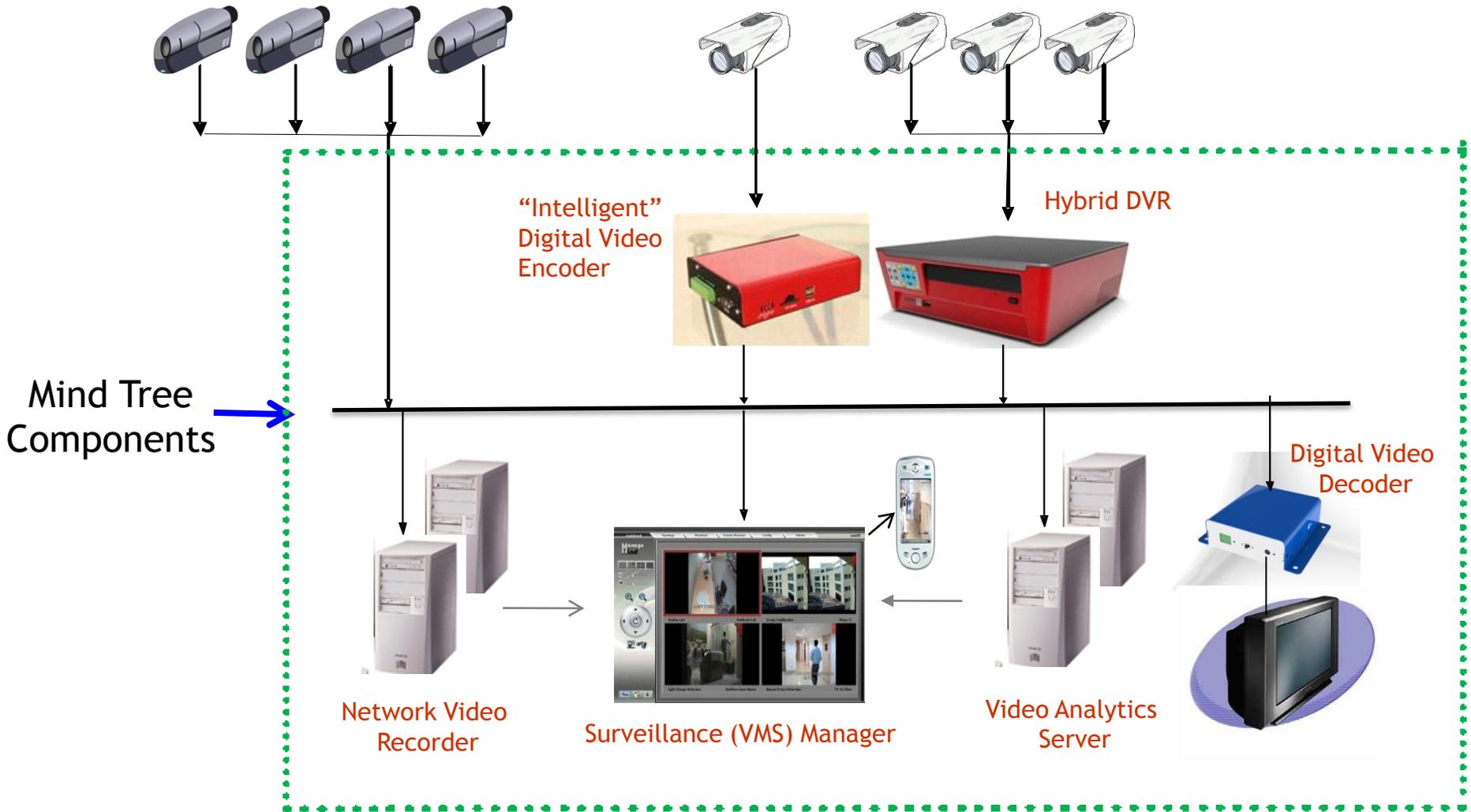
Standards Based | Intelligent | Scalable | Distributed | IP Ready

# MindTree Portfolio

• Video Analytics Algorithms
• Video Search

**Analytics**

• Surveillance Manager
•Network Video Recorder

**Management**

•Digital Video Recorder
•Smart Video Encoder
•Video Decoder

•Video Analytics Server
•ONVIF Stack
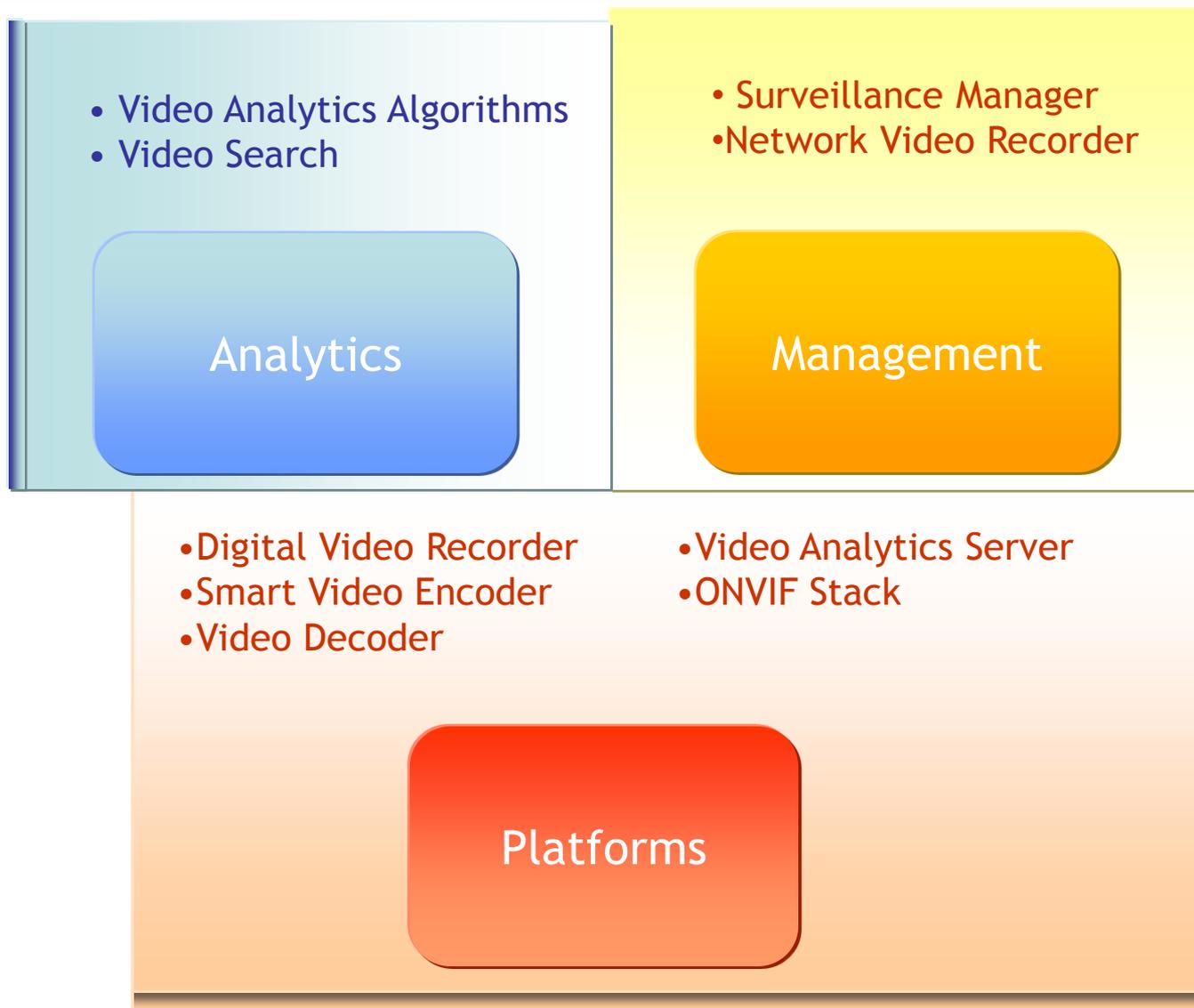
**Platforms**

*SecureMind*
Video Analytics Algorithm Suite (VAAS)

# SecureMind : Portfolio

| Watermarking | | Thermal-Analog Fusion | Sterile Zone Monitoring | |
| --- | --- | --- | --- | --- |
| Image Stabilization | View Tamper Detection | License Plate Recognition | Virtual Tripwire | Video Summarization |
| Video Stitching | Significant Activity Detection | Object Counting | Face Detection | Event Search |
| Virtual Zoom | Activity Detection | Object Tracking | Foreign Object Detection | Object Search |
| **Display** | **Content Analysis** | | | **Search** |

# SecureMind : Key Features

**Low Complexity
Patented
Real-Time**

- Works in Real-Time at CIF resolution
- Efficient Usage of Processor Power And Memory
- Algorithm Independent of Platform And architecture
- Optimized for TI DM 64x and Intel

**Flexible Deployment
Rules Support**

- Deployable for Edge Based Analytics or Server Based Analytics
- Indoor and Outdoor Usage
- Minimum Calibration and Training
- User Defined Rules and Regions
- Tunable Algorithms
- ONVIF Compliant
- Integrated with VMS

**Algorithms** | **Porting & Optimization** | **Custom Solutions**
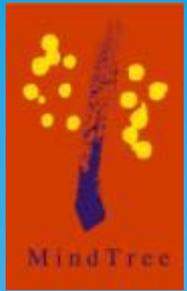
*ManageMind*
Surveillance Manager (SM)

# ManageMind: Topology

## Cameras, Video Encoders

analog camera

encoder

**IP Camera**

**PTZ Camera**

## 3rd Party Systems

**Sensors**

**Access Control**

**Announcement Systems**

Switch

**DVRs**

**NVRs, VAS**

**Network Storage**

**Storage**

**Server**

Display

disk

**Mobile Mgmt. Client**

**Remote Mgmt. Client**

*ManageMind*

I Gbps Ethernet

10/100 Mbps Ethernet
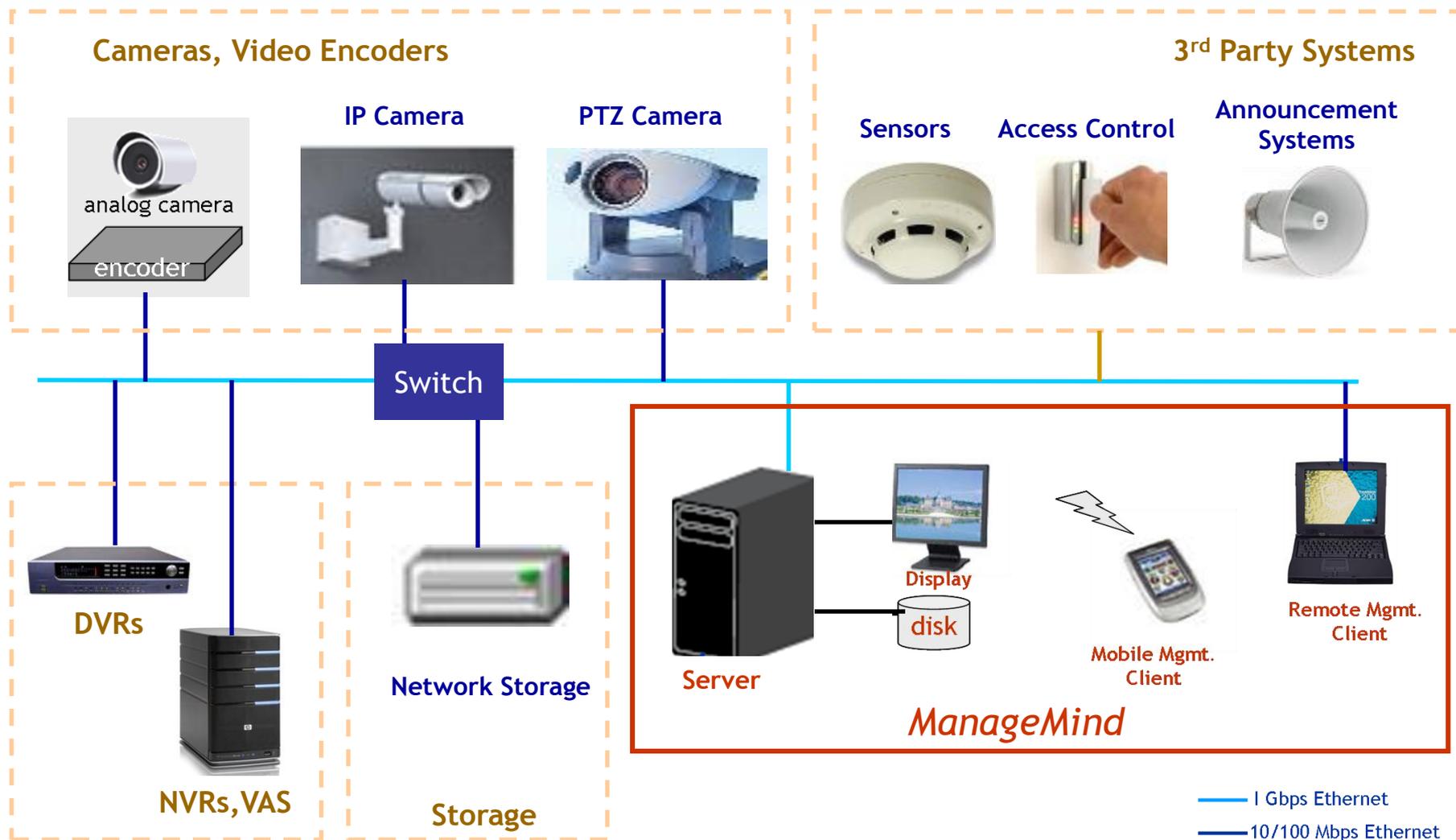
## Observe, Analyze, Alert, Record, Manage

# ManageMind: Key Features

## Display

• Live video: Full screen, tiled modes
• Real time & recorded alerts, alarms, events and reports
• Topology
• Real time status

## Recording

• Linear, continuous, scheduled
• Overwriting based on policy
• Record if activity is detected
• Record if human or vehicle activity is detected

## Configuration & Control

• IP camera, video encoder, DVR, storage, network element settings
• Users, groups, roles, ACL
• Display & recording
• Events, alarms, alerts & rules

## Search & Playback

• Fast search on recorded video, alarms & events
• Device independent search
• Search on date, time range, camera, meta data & alarm
• Forward, rewind & pause – playback controls
• Video Mining

## Events

• Event and alarm management
• Event & alarm search
• Historic alarms
• Event & alarm action – Email/SMS/MMS/trigger relay

## Administration

• Fault log management
• Storage management
• Network management
• Scheduled/automatic back up
• Performance

**Centrally Manage Diverse Elements** | **Highly Scalable** | **Powerful Search** | **Analytics as plug-ins**

# ManageMind: Key Features
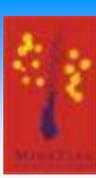
## Display: Video Web Client



## Display: Mobile Client



## Search & Playback
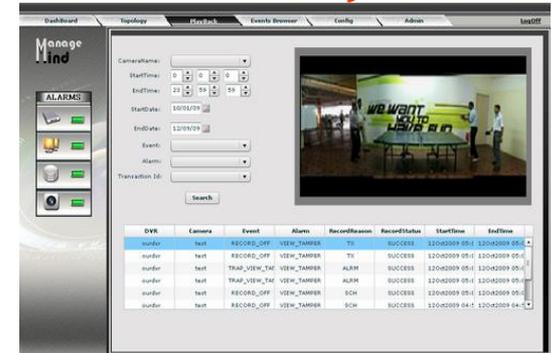


## Record
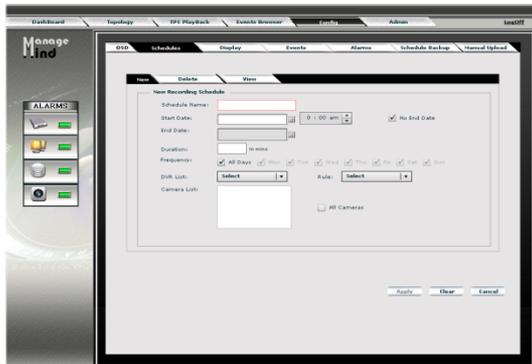


## Configure: Alert
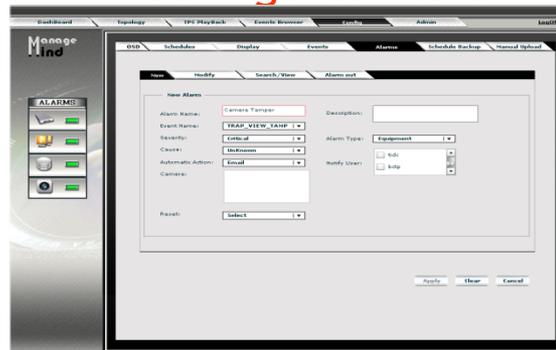


## Display: Events



**ManageMind Lite**

**ManageMind**

# ManageMind : Key Benefits

## Open Architecture

- Web Based System
- Runs on COTS Hardware/Software Platforms
- Standards Support

## Device support

- Manage DVR, NVR, DVE, IP Cameras, networking and Storage equipment
- IP Cameras – Axis, Basler, HikVision, Pelco

## Scalable

- Distributed and Scalable Architecture
- Powerful Search and Archiving

# Platforms

# Platforms

**Digital Video Recorder**

**Video Adapters**
- Encoder
- Decoder

**Intelligent Platforms**

**Software Solutions**
- ONVIF Stack
- IP Camera Software Stack
- Camera Virtualization Tool

**Video Analytics  Server**
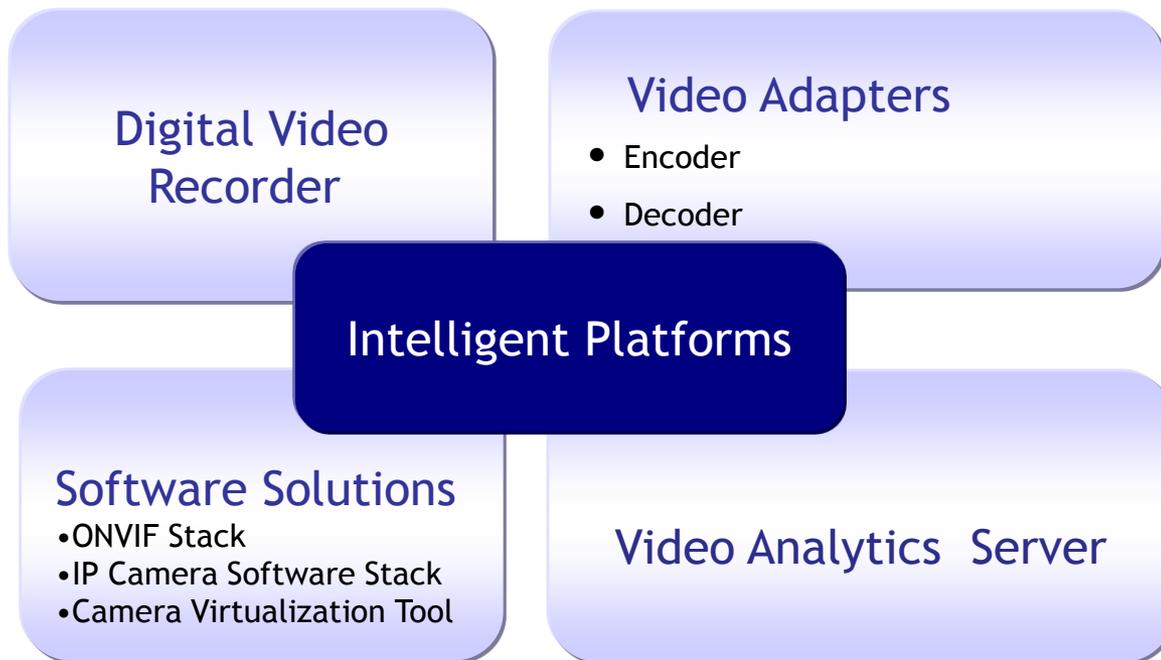


**4 Channel Hybrid DVR**



**Encoder**

**Form Factor Ready-to-Manufacture Designs** → **Software Solutions** → **Custom Designs**

# Digital Video Recorder – Key Features

## Video

- Composite Video In (NTSC/PAL)
- IP Camera Support
- Codec : H.264
- Resolution : D1, CIF, QCIF
- FPS : 30 / 25 (PAL)
- Video Streaming at 2-3 Mbps

## System/Storage

- Security Console
- IR Remote Control
- Alarm I/O, PTZ, Audio
- SATA based HDD Support
- S.M.A.R.T support
- Archival to USB, DVD
- ISO 8583 Support (optional)

## Security

- Detection of View tampering
- Video Watermarking
- Remote Backup & Recovery
- Access Control
- Secure Data Transmission (optional)

## Analytics

- Video Content Analysis Algorithms
  - Activity Detection
  - Object Classification
  - Tracking
  - TripWire
  - Foreign Object Detection
- Video Search

## Management

- ONVIF, SNMP Support
- Comprehensive Alarm Management
- Support for Multiple camera, DVR configurations
- Dashboard, Topology and Administration
- PC and Mobile Clients

# Network Video Recorder

**Runs on COTS Linux Server**
RHEL5, Suse

**All Features Accessible from a Standard Browser**

**Record up to 64 Channels per Server**

**Supports**
H.264
MPEG-2/4

**Recording Modes**
Manual
Alarm triggered
Scheduled
Significant Activity

**Supports**
Networked Hard Drives
RAID Storage

**Synchronized Audio Video Recording**

# Camera Encoder – Key Features

## Video
- Up to 4 Composite Video (NTSC/PAL) In
- Codec : H.264
- Resolution: D1, CIF, QCIF
- Video Streaming : 2-3 Mbps

## System
- Alarm I/O, PTZ, Audio
- Local Storage : SDHC
- GPS, Accelerometer, sensors (Optional)
- SNMP Support
- Integrated with VMS

## Analytics
- Basic
  - Significant Activity Detection, View Tamper, Watermarking
  - Per Channel
- Advanced
  - TripWire, Foreign Object Detection, Face Detection
  - 2 Channel support

**Form Factor BOM Optimized Design**

# ONVIF Stack
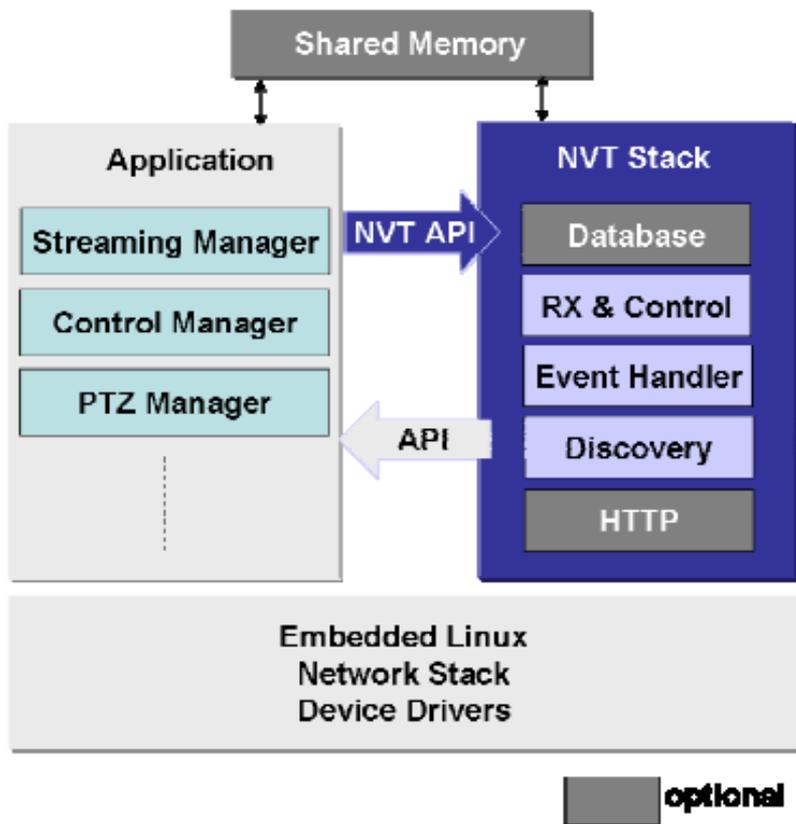


Sample NVT Stack Architecture

**NVT Deliverables**

- Compliant to ONVIF 1.01 Version
- NVT
  - Ported on Embedded Linux, Windows
  - Portability Considerations
    - ANSI C Code
    - Low Foot Print
    - Low Latency Architecture
    - Customizable (external) interfaces
    - Camera Configuration Layer
- NVC
  - C Library on Windows & Linux
  - Web Based Clients
- ONVIF Forum Test Tool Certified

# Success Stories

## 1. Bangalore Traffic Police

- Manage data related to traffic incidents and generate tickets for traffic violations automatically

- Significantly reduce manual effort spent in generating tickets, backlog of tickets to be generated eliminated

- Easy status tracking of tickets

- Producing evidence of the incidents

- All data related to traffic incidents annotated, indexed and backed up for easy retrieval

## 3. ONVIF Library for IP Camera

- High-end IP camera with advanced video analytics
    - Resolution: D1 and HD
    - Compression: H.264
    - Power over Ethernet, GPS, Zigbee
    - Wireless-enabled

- Licensed MindTree ONVIF Library to make it ONVIF compliant

- Reduced engineering time by several months

## 2. MindTree Campus Surveillance

- ManageMind VMS, NVR and SecureMind Video Analytics used

- Complete video installation management by ManageMind

- Video Analytics
    - Activity detection with Region of Interest selection
    - View Tamper Detection
    - Guard Presence Detection

- NVR for control of all cameras (IP cameras)

## 4. Image Stitching Algorithm

- Licensed MindTree's Real-Time Image Stitching Algorithm that combines videos from multiple cameras with overlapping views to create a single View

- Can handle images form up to 3 cameras

- High quality stitching even when video has moving objects

- Supports different camera positions: co-located & stereo-view

- Minimal ghosting artifacts

- Dynamic feature matching and blending – no scene training needed

Imagination  Action  Joy

www.mindtree.com

# Backup

# SecureMind : Specifications

| | |
|---|---|
| **Available Platforms** | TI's DM6467, Intel (Windows) |
| **Video Input** | Raw or Decoded Video at 25/30FPS |
| **Video Format** | YUV 420, 422, RGB |
| **Resolution** | CIF |
| **Integration Options** | IP camera, Encoders, DVR, NVR, Management Server Protocols – SNMP / ONVIF |
| **Region of Interest (RoI) Support** | Yes, with Multiple, overlapped RoI |
| **Overlay** | Yes |

# IP Camera Software Stack
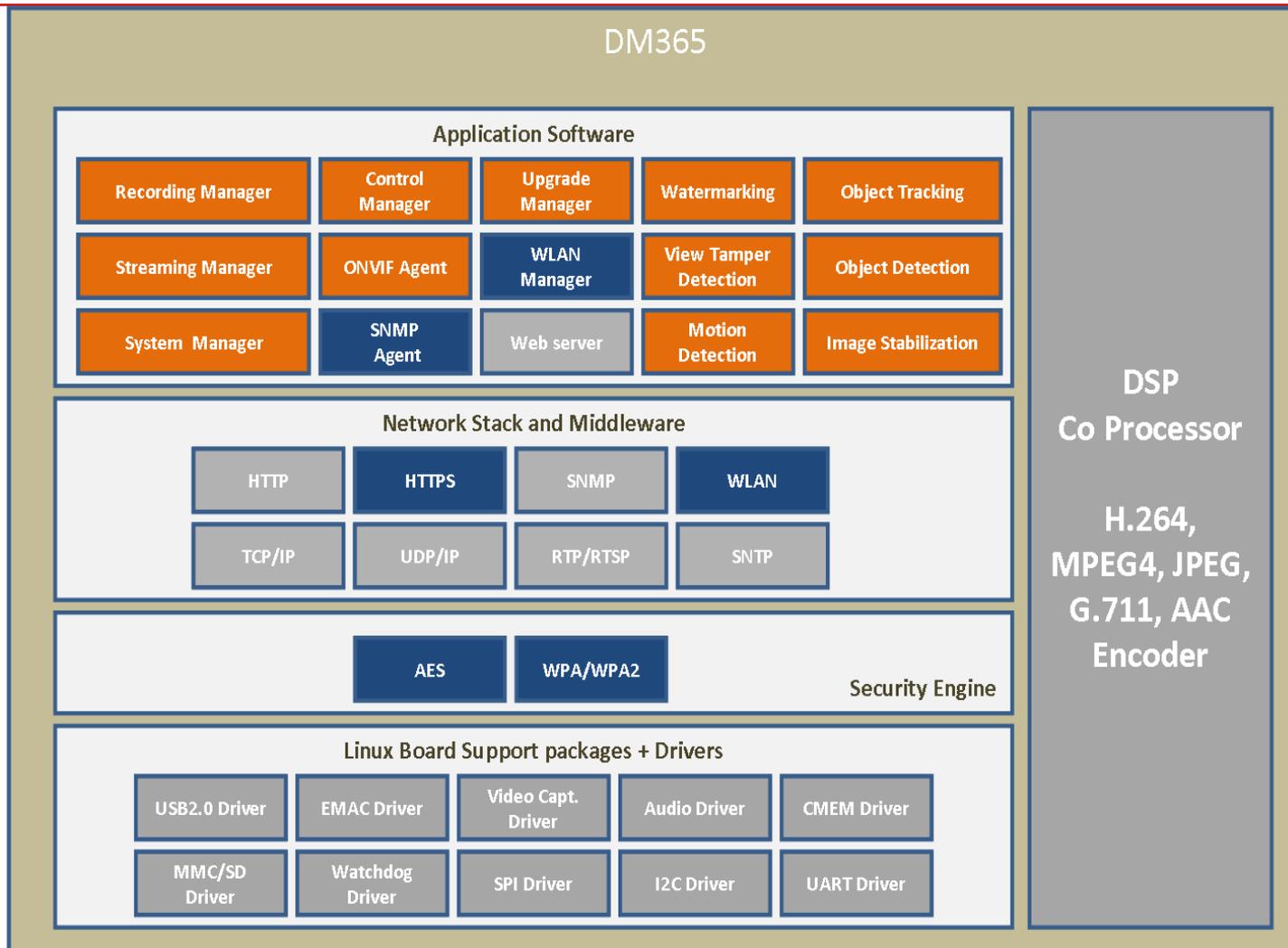
# Camera Virtualization Solution

•Setup 100s of IP Cameras, DVRs, NVRs, Servers to simulate real-world scenarios!!

### Camera Virtualization
•Create Virtual IP Cameras with data and control
•capability
•Combination of Virtual and physical devices



Before
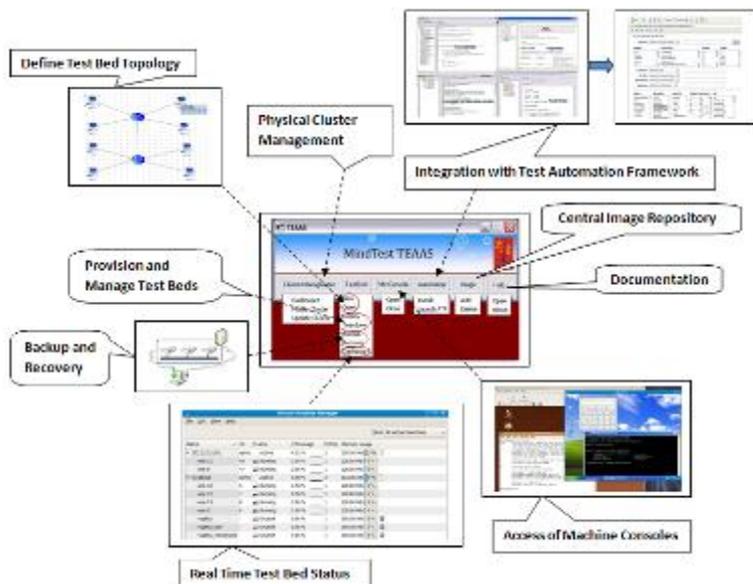


MindTree Virtualization Framework



After