Management System for Accedian Performance Elements and Performance Modules

SkyLIGHT Director™
Network Performance Management Platform

As Carrier Ethernet continues to grow, network operators are increasing their footprint to reach new customers, open up new markets, and increase their revenue stream.

Managing networks has become increasingly complex; reducing operational expenses and increasing productivity become key strategies in maximizing shareholder value.

Accedian SkyLIGHT Director™

SkyLIGHT Director™ is a centralized management platform for Accedian network performance elements and modules. It provides FCAPS functionality for Accedian performance elements and modules including the CE, FS, FS 10G, LT, GE, GT, GX, NE, AT, Classic Actuator/VCX, Nano, and ant.

Multiple concurrent users can view and manage these Accedian devices, greatly simplifying the tasks of network operators. From initial installation through unit lifecycle administration and maintenance, SkyLIGHT Director simplifies, secures and accelerates Ethernet service validation, fault management, and performance.

Management of Accedian Devices

SkyLIGHT Director combines proven open source platforms with a browser-based end user interface to provide a powerful management tool for your Accedian products. Built around a robust task automation engine, it can perform network-wide operations for device backups, device commissioning, firmware upgrades and even run multiple concurrent service validation tests.

By extending the Accedian Plug & Go™ instant provisioning system, SkyLIGHT Director reduces operational effort to an absolute minimum. New units go from the box to being managed in just minutes.

Product Benefits

- Point-and-click web browser based user interface
- Centralized fault management
- Northbound SNMP API for Network Management System (NMS) alarm integration
- Commissioning workflows for efficient node turn-up
- Job scheduling for automation
- Plug & Go™ inventory discovery
- Remote device inventory and management
- Network-wide configuration backup and restore functions
- Network-wide firmware upgrades
- One-second, stream-based performance data collection
- Centralized service turn-up validation
- Commissioning templates
- Radius based authentication
- Appliance-based deployment model for peace of mind
Plug & Go NMS/SkyLIGHT Director Integration

1. Device is received and powered on the network
2. Device receives periodic beacons from the beaconing NID and configures its management channel from the beacon information
3. Device identifies itself to the inventory-tracking NID
4. SkyLIGHT Director™ monitors the tracking NID and adds the new device to its list
5. SkyLIGHT Director establishes communication
6. SkyLIGHT Director provisions the device

Fault Management

The SkyLIGHT Director Vision Module provides centralized fault management for a rapid view of your network health. An alarm banner is always visible, providing a quick tally of all active alarms, as well as any loss of connectivity to the underlying elements.

Operators can drill down in the active alarms event list, which displays the most recent events in the system. This list provides alarm conditions, source entities and probable cause details.

SkyLIGHT Director™ provides real-time events by listening for activity from the underlying network. The alarm list is periodically refreshed on each device to maintain accurate alarm counts and to ensure operators are provided with an exact view of active alarms.

Alarm Query

Sorting and filtering active alarms is possible through an active alarms query tool. The multiple query options available can be combined to provide a view based on specific network elements, severity or time range.
Configuration Management

The SkyLIGHT Director Vision Module automates network-wide configuration management through its inventory collections, unit backup archiving and export functions and firmware management capabilities. Its task automation engine can process thousands of Accedian devices at the same time. Configuration files can be stored on either the server or on an external server, depending on your specific requirements.

Configuring a Backup Job

Quickly restore a unit’s previous configuration or swap in a replacement unit in a few easy steps.

Restoring a Node

The SkyLIGHT Director™ Vision Module supports large-scale firmware upgrades for individual units, as well as for groups of units that can be broken down into smaller target clusters for incremental execution.

Multi-threaded batch processing and status tracking enable full-inventory upgrades to be completed and verified within time-sensitive maintenance windows.
Device Commissioning
SkyLIGHT Director offers Vision Flow as an optional, value-added application. Vision Flow provides network operators with template-based commissioning tools to standardize and streamline the device turn-up process.

Leveraging the flow engine, commissioning operations can be either launched automatically upon device installation or scheduled for a single device or multiple devices concurrently.

Vision Flow Configuration Job

- Centralized template-based commissioning of Accedian Network Performance Elements. Intuitive GUI-based templates reduce operator’s node turn-up times.
- Automated commissioning on device installation.
- Batch support for mass deployment of commissioning changes. No more logging into individual nodes for bulk edits.
- Data set support provides the means to tailor templates to specific node attributes while keeping wildcard values for common attributes.
- Daily scheduling for execution of routine tasks and deferred scheduling for the execution of unattended tasks.
- Progress tracking for job monitoring and job control to interrupt in-progress activities.
- REST based API for OSS integration
- Direct OPEX savings resulting from improved efficiencies in device turn-up times and consistency.

Vision Flow Execution

Vision Flow Job Scheduler

Device Turn-Up Made Simple
As part of the SkyLIGHT performance assurance platform, the SkyLIGHT Director Manager Module provides a comprehensive solution for creating TWAMP and Ethernet DMM sessions verifying network SLA conformance on a granular and continuous basis. The SkyLIGHT performance assurance platform enables one-way monitoring of network performance with high accuracy without the need for external synchronization.

End-to-end SLA Monitoring

A Comprehensive Suite of Tools

- **V-NID Actuator/VCX** – the active performance measurement component in the performance management architecture
- **Performance Monitoring (PM) Reflector** – an Accedian or third-party standards-based responder of the measurement frames sent from a V-NID Actuator/VCX
- **Manager Module** – the main controller of V-NID Actuators/VCX that provides performance and SLA monitoring suite
- **SkyLIGHT Analyzer** – Stand-alone GUI application for visualizing performance metrics and generating detailed reports

**Feature Highlights**

- Standards-based one-way network performance assurance solution using ETH-OAM, TWAMP and Accedian Standards+
- Standards+ supports extended measurement types for even greater performance visibility
- Patented, high-accuracy one-way delay measurement technique without need for synchronized hardware test points at each end of connection
- Centralized or distributed measurement injection using the V-NID Actuator
- Centralized provisioning, management, mediation and reporting
- Scalable deployment with integration into the SkyLIGHT Director Vision Module
- IP, Ethernet and OAM end-user experience metrics summarized and displayed via SkyLIGHT Analyzer performance monitoring charts or exported to 3rd party reporting tools via XML NBI.
- Integrated into the SkyLIGHT Analytics platform
- Achieve sophisticated monitoring with Service OAM 802.1ag/Y.1731, Accedian PAA™, and FlowMETER™ support
Performance Management
Data is the great equalizer. Providing network operators and service providers with insightful data about the performance of their network is paramount to ensuring that SLAs are being met and that the required quality of service is being delivered to end customers.

SkyLIGHT Director™ offers Vision Collect as an optional value-added application to obtain this data. Vision Collect is a performance data collection and distribution engine that provides near-real-time statistics, down to one-second granularity.

In order to optimize network bandwidth while minimizing CPU and data-caching requirements, a permanent data stream is established between the devices and the SkyLIGHT Director™ platform.

Performance Data Streams

<table>
<thead>
<tr>
<th>Feature Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized configuration and collection of performance metrics for up to 4,000 devices at one-second granularity (clustered configuration)</td>
</tr>
<tr>
<td>Immediate access to available data</td>
</tr>
<tr>
<td>Scales to thousands of units and up to 200,000 one-second data streams</td>
</tr>
<tr>
<td>Streamlines the device and appliance CPU and memory profiles</td>
</tr>
<tr>
<td>Optimized network bandwidth</td>
</tr>
<tr>
<td>Reception of one-second bins for:</td>
</tr>
<tr>
<td>PAA™</td>
</tr>
<tr>
<td>Policies</td>
</tr>
<tr>
<td>Port Statistics</td>
</tr>
<tr>
<td>Regulators</td>
</tr>
<tr>
<td>FlowMETER™</td>
</tr>
<tr>
<td>Reception of one-minute bins for all historical data</td>
</tr>
<tr>
<td>Service OAM DMM, Packet Loss, TWAMP, Shaper, Service Availability (SA), SA Metrics and Service Level Management</td>
</tr>
<tr>
<td>Distribution of performance data to third-party systems through SFTP and RSYNC</td>
</tr>
</tbody>
</table>

Vision Collect Status

<table>
<thead>
<tr>
<th>Name</th>
<th>Serial</th>
<th>PAA</th>
<th>Policies</th>
<th>Port Statistics</th>
<th>Regulators</th>
<th>FlowMETER</th>
<th>Reception of one-second bins for:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Vision Collect Data Distribution™
## Service Performance
### RFC-2544 and Y.1564 Testing
SkyLIGHT Director™ offers Vision SP (Service Performance) as an optional value-added application. Vision SP is an ITU-T Y.1564 and RFC-2544 coordinator that enables centralized configuration and control of service validation tests.

From one central screen, network operators can configure tests that include loopbacks for two-way flows and offering the possibility to configure reverse tests for one-way flows.

Once tests are configured, SkyLIGHT Director™ is used to launch them from a central location. Test progress can then be monitored and test results retrieved in real time as the test runs.

Leveraging the Vision SP task-automation engine, multiple tests can be executed in parallel by multiple operators, providing a truly centralized service-validation hub.

Near-end and far-end inventory drop-down lists guide operators through the test configuration process by suggesting available Layer-2 and Layer-3 interfaces on the target endpoints. SkyLIGHT Director™ handles the testing configuration on all nine devices.

Once configuration jobs are set up, SkyLIGHT Director™ is used to apply them to network elements from a central location. Leveraging the task-automation engine, multiple configurations can be applied to one or several network elements in parallel.
Centralized Licensing for SkyLIGHT™ Solutions

Pooled License Distribution
The SkyLIGHT Director™ License Server provides a central repository of all license entitlements in your network.

License consumers, such as the SkyLIGHT VCX™, are configured to request licenses from this central location, allowing the same licenses to be shared amongst all SkyLIGHT VCX™ instances in your network.

Capacity Management of Licenses Features
Using a simple graphical interface, operators can quickly deploy entitlements to the network; view the number of entitlements available as well as those that are in use.

Virtualized Deployment Model
Available as both VMWare and KVM virtual appliances, the License Server is deployed to existing customer virtualization infrastructures with a lightweight footprint. It can also be deployed to an Accedian SkyLIGHT™ Appliance.
## Specifications

### SkyyLIGHT Analyzer PC

<table>
<thead>
<tr>
<th>Appliance Type</th>
<th>Hardware</th>
<th>KVM</th>
<th>VMWare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported Hypervisors</td>
<td>KVM</td>
<td>KVM 3.10+ kernel / libva 1.2.8</td>
<td>ESXi 5.5+</td>
</tr>
<tr>
<td>CPU</td>
<td>E3-1200  family</td>
<td>4 CPU Cores</td>
<td>2 CPU Cores</td>
</tr>
<tr>
<td>RAM</td>
<td>32 GB</td>
<td>16 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Disk Size</td>
<td>400 GB RAID 1</td>
<td>400 GB</td>
<td>400 GB</td>
</tr>
<tr>
<td>Management Port</td>
<td>One 10/100/1000 Mbps Ethernet (front) RS232 serial port (RJ45)</td>
<td>virsh</td>
<td>VMWare console</td>
</tr>
<tr>
<td>Network Interfaces</td>
<td>Four 10/100/1000 Mbps Ethernet (front)</td>
<td>Up to 8 virtual interfaces</td>
<td>Up to 8 virtual interfaces</td>
</tr>
<tr>
<td>Disk I/O requirements</td>
<td>Solid State Drive / 5K read &amp; write operations per second @ 6 KB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Physical Dimensions (weight):**
431 x 44 x 550 mm (12 kg)

**Power Supplies:**
1U ATX redundant 275W each, AC 100–240V @ 50–60 Hz

**Power Consumption:**
25W (max) 150W typical

**Regulatory Compliance:**
CE emission, FCC Class A, RoHS

### Manager

<table>
<thead>
<tr>
<th>Appliance Type</th>
<th>Hardware</th>
<th>KVM</th>
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<tr>
<td>Disk Size</td>
<td>400 GB RAID 1</td>
<td>120 GB</td>
<td>120 GB</td>
</tr>
<tr>
<td>Management Port</td>
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</table>

**Data Retention:**
Four weeks @ 1 minute granularity

**Physical Dimensions (weight):**
431 x 44 x 550 mm (12 kg)

**AC Power Supplies:**
1U ATX redundant 275W each, AC 100–240V @ 50–60 Hz

**DC Power Supplies:**
1U 250W redundant 40V–72VDC, 10–5A

**Power Consumption:**
25W (max) 150W typical

**Regulatory Compliance:**
CE emission, FCC Class A, RoHS

**Redundancy Scheme:**
Warm Standby

### License Server

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<th>VMWare</th>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Supported Devices</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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</tbody>
</table>

**Supported Sessions:**
20,000 @ 1 minute granularity stand alone

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1. When collocated with Manager module on SkyyLIGHT Director Appliance
2. Requires 4 physical appliances in a cluster configuration
3. 8 GB when collocated with SkyyLIGHT Director Appliance
4. Supports up to 1TB; plan 80 GB per week of result data storage
5. When collocated with Vision module on SkyyLIGHT Director Appliance
## Features

<table>
<thead>
<tr>
<th>SkyLIGHT Director Features</th>
<th>Classic Actuator</th>
<th>GE</th>
<th>AT-108 AT-1008 AT-1024</th>
<th>SkyLIGHT VCX</th>
<th>FS</th>
<th>FSX</th>
<th>TE</th>
<th>GT / GX</th>
<th>10GE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware Version</td>
<td>6.6</td>
<td>4.7 &amp; 4.9</td>
<td>1.1 &amp; 2.1</td>
<td>2.0+</td>
<td>All releases</td>
<td>2.0</td>
<td>5.4 and above</td>
<td>6.0 and above</td>
<td>5.4 and above</td>
</tr>
<tr>
<td>Configuration Backup</td>
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<td>Configuration Restore</td>
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<td>Job Scheduling</td>
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<tr>
<td>Firmware Upgrade</td>
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<tr>
<td>Standing Alarms</td>
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<td>Alarm Bursts</td>
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</tbody>
</table>

### Vision Flow

#### Commissioning Workflows
- N/A
- 4.7 & 4.9
- 1.1 & 2.1
- 2.0+
- All releases
- 2.0
- 6.0 and above
- 6.0 and above
- 6.0 and above

#### Supported Templates
- N/A
- Custom Commands
- Custom Commands
- CMF, Custom commands, DMM Reflector, FlowMETER, Discovery Configuration
- DNS, system time, SNMP agents and traps, NTP, PTP, PAA, ports, management interfaces, L2 filters, VID sets, IPV4 filters, bandwidth regulators, regulator sets, COS profiles, VC agent policies, traffic configuration, custom commands, Y.1731, TWAMP, MFD, NE Attributes & user management

### Vision Collect

#### Streaming API
- 2.0+
- All releases
- 2.0
- 6.0.1 and above
- 6.0.1 and above
- 6.0.1 and above

#### Granularity – Low Res
- 2.0+
- All releases
- 2.0
- 6.0.1 and above
- 6.0.1 and above
- 6.0.1 and above

#### Granularity – High Res
- 2.0+
- 1.0 and above
- 2.0
- 6.3.1 and above
- 6.3.1 and above
- 6.3.1 and above

#### Bandwidth Requirements
- 200 Kbps (low) 350 Kbps (high)
- 16 Kbps (low) 43 Kbps (high)
- 200 Kbps (low) 350 Kbps (high)
- 16 Kbps (low) 43 Kbps (high)
- 43 Kbps (low) 147 Kbps (high)
- 200 Kbps (low) 350 Kbps (high)

### Vision SP

#### Y.1564 Support
- N/A
- All releases
- N/A
- 5.0 and above
- 5.5 and above

#### Y.1984 Flows Supported
- N/A
- 2
- N/A
- 8
- 8

#### RFC-2544 Support
- 2.0+
- All releases
- N/A
- 5.4 and above
- 5.5 and above

#### RFC-2544 Flows Supported
- Licensed
- 1
- N/A
- 1
- 1

#### EMIX Support
- N/A
- No
- N/A
- No
- Yes
- Yes

#### Number of Tests Defined (per device)
- Licensed
- 16
- N/A
- 16
- 16
- 16

#### Number of Running Tests (per device)
- Licensed
- 1
- N/A
- 1
- 1
- 1

#### Number of Running Tests (per SD)
- 20

#### Number of Tests defined (per SD)
- 100,000

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