A.I. - The Key to Creating Intelligent Application Driven Networks

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What is AD-NET?

AD-NET is the umbrella term for H3C's SDN solution aimed to help customers rebuild networks during digital transformation.

AD-NET Application Driven Network

- Application Innovation
- Revolute Technologies

- Intelligent healthcare
- Intelligent manufacturing
- Intelligent buildings
- Intelligent datacenters
- DevOps
- IoT
- Cloud
- Big Data
- SDN & IBN
- Edge computing
- AI
What AD-NET Helps: Reduced Equipment, Expanded Operation

- Fully connected
- Software-defined
- Application-driven

Means of automation

- Network Policy
- Translation and arrangement of requirements
- Network information analysis

Intelligent, Agile, Robust, Simple

Traditional Practice

Automation

Intelligent networks
Typical Scenarios for AD-NET

Business applications

Datacenters
- AD-DC
  - Flexible scalability for networks
  - Agile allocation for CT resources

WAN
- AD-WAN
  - Visible network application traffic
  - Protection for key application paths

Campus networks
- AD-Campus
  - Flexible networks that follow peoples movements
  - Intelligent operations & maintenance; smart IoT

AD-Net: H3C’s scenario-based SDN solution
Driving Forces | Changes in Datacenter Business Drive Network Transformation

- Frequent business changes
- Tight deadlines for business to go live
- Changes in traffic model
- Business disaster recovery deployment
- Faster release of network strategies
- Network channels quickly ready
- Flexible protection for the Eastbound/Westbound traffic
- Unified management of network resources

80% ≠ 20%
AD-NET is upgraded to 5.0, i.e. AI-oriented

Next-generation Intelligent Network Solution
**New Experience: Convergence & Intelligence**

**Converged, enhanced experience**
- Cross-scenario unified orchestration for DC, WAN, and campuses, unified portal, unified strategies, unified management, upgraded user experience
- Convergence: design, arrangement, control to ensure close-loop network management for the full lifecycle and reduce management complexities

**Simplify operations & maintenance with intelligence**
- Telemetry, networks equipped with more detailed, close to real-time insights;
- Seer Analyzer, massive, multi-dimensional, granular data collection and deep analyses of networks
- End-to-end visibility into business and protection for DCs, WANs, and campuses
Unified Architecture: Seer Network Architecture (SNA)

- **Openness**: simplifying internal & external ecological integration
- **Convergence**: simplifying management of resources
- **AI Empowerment**: lowering use, operation & maintenance cost

**Seer Network Architecture**
- **Design**
  - Design Studio
  - Automatic deployment
  - SeerEngine Seer SDN controller
  - Configuration Distribution Netconf, Openflow BGP-LS, PCEP and SNMP

- **Simulation**
  - SNA Center
  - Service data collection

- **Deployment**
  - Deployment Machine
  - Cloud Native Unified Platform (Container and Micro-Service)

- **Assurance**
  - AI Assurance
  - Intelligent Empowerment
  - Data Collection of Equipment Telemetry, ERSPAN, Syslog and Netstream

**Key Components**
- SeerAnalyzer Seer Intelligent Analyzer
- Security
Full-scenario AI

Local training, simple and agile

SNA Center Seer Network center
- SeerAnalyzer Seer Intelligent Analyzer
  - Intelligent analysis
  - Data storage
  - Data Desensitization
  - Data collection

Cloud Native Unified Platform
- Telemetry / INT / gRPC / ERSPAN / Netstream

Training on cloud, infinite computing capacity

Model management
Post-training model
Data storage

Machine learning
- Time series model
- In-depth learning / transfer learning
- Natural Language Processing
- TensorFlow / Caffe / MXNet

AI cloud service

Park office
Data Center
WAN
Application Model 1: Optical Modules Fault Forecast

**Key Technology**
- Obtain DDM data and alert from Optical Modules periodically through data acquisition Modules
- Analyze and detect whether any malfunction transpired at current optical module and have root cause analysis; predict the trend of fault in the optical module by knowledge graph, regression algorithm and classification algorithm

**User Value**
- Predict the trend of fault in the optical module; remind user to replace the optical module to prevent network failure

**Data Classification**
- Data Preprocessing
- Data Transformation

**Time Series Forecast**
- GAM
- STL+ETS

**Forecast to obtain visible data**
- Without supervised learning for anomaly detection
  - 3-SIGMA
  - EWMA
  - Polynomial Interpolation
  - Twitter AD

**Anomaly Judgment**
- Without supervised learning for anomaly detection

**Rule-base**
- Automatically compose to sample base
- Remark

**Featured engineering**
- Analysis
- Fitting
- Statistics

**With supervised learning for anomaly detecting model**
- Training Model

**Remark**
- A supervised learning for anomaly detection will be initiated when the credit reaches a certain degree and provides the training model.
Application Model 2: User Experience Analysis for Audiovisual Applications

Professional Tools are needed to undergo positioning and analysis, as audiovisual applications are extremely sensitive on the latency, packet loss, and jitter.

**Key Technology**

- Through the real-time detection between the establishment and termination of the audiovisual conversation by SIP Snooping, and the collection of quality indicators (eMDI) from audiovisual traffic flow analysis session on the synchronization device, including the packet loss rate, maximum continuous packet loss value, retransmission rate, jitter, and MOS value.

- The collected data will be transmitted to SeerAnalyzer, while it will match those data of conversation and users, presenting the quality of the user’s audiovisual experience.

**User Value**

- When the quality of user’s audiovisual experience is degraded, users can check the relevant data links, packet loss or congestion through the message from user conversation, access location, and access method.

- SeerAnalyzer can find out the cause of the problem rapidly, adjust the data link or QoS configuration, to solve the problem before receiving the fault report.
**Application Model 3:**
Real-time Positioning for Anomaly Application Traffic

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<th>Features</th>
<th>Application</th>
<th>Value</th>
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| By adopting INT Technology, the solution can demonstrate the anomaly traffic forwarding (congestion, packet loss, etc) in a real-time and application-based manner and identify the discarded packets. | Combining with INT/gRPC technologies, the solution can quickly locate the exact location of the application forwarding when anomaly fault finds together with the past records. | - High accuracy troubleshooting  
- Fault positioning in minute-level |

**Conclusion:** The real-time (Data collects in every 5 mins in a traditional network) and high accuracy fault positioning under a granular application is the most significant difference between the protection from Seer and the traditional network management system.

**Application Scenario**

- **Microburst Scenario:**
  When a large number of servers form a cluster, enormous EAST-WEST traffic from the Big Data services, including searching and parallel computing can be obtained. The traffic to a single server will cause the switch port to be congested instantly when the data load is uneven.

- **Packet Loss Scenario:**
  Different types of applications happen in DC, the quality of applications will be affected once packet loss has occurred. The content of the discarded messages will be needed to analyze the specific impact on the business and detect the network failures timely.
Why H3C AD-NET?

AD-DC
700+

AD-WAN
50+

AD-Campus
400+

Certified by trusted organizations
- CTTL
- China Future Internet Engineering Center
- Global SDN Certified Testing Center

No. 1 in market share
sources: CCW Research 2018/04

Open eco system collaboration
F5, A10, Srun, dr.com, WRD Tech
coordinated cloud by different vendors
Thank You