



# Storage Networking

## XML-based Network Management

Tail-f Systems is a leading provider of XML-based network management software and tools to enable storage networking vendors to build IP-based management systems. Trends like SAN consolidation, unified management, increasing intelligence in embedded storage networking platforms, and demands for role-based access control are driving the need for more sophisticated management capabilities. Tail-f's software is designed to develop robust management solutions for a range of IP storage devices including storage switches and routers.

### Powerful Management Interfaces

Tail-f Systems' ConfD software helps developers to rapidly build modern management interfaces including CLIs, Web UIs, SNMP and NETCONF interfaces. Additional interfaces, such as a SOAP interface, can also be easily added to ConfD. All management interfaces are automatically rendered from a common data model using ConfD's powerful software engine. This approach radically speeds time-to-market and reduces sustaining engineering costs resulting from tedious recoding that is typical in stovepipe architecture.

ConfD's CLI and Web UI include a rich set of features designed to meet the needs of system administrators. For example, the CLI interface can be automatically rendered in Cisco (IOS and IOS XR) or Juniper styles. The Web UI uses modern tools such as AJAX that enables real time updates of information. Both CLI and Web UI interfaces can be extended and customized to conform to corporate guidelines.

### Support for Blade Platforms

ConfD supports a wide range of hardware deployment models including appliances, blade servers, and ATCA platforms. For example, management applications can reside on a dedicated management blade or be distributed across multiple functional blades in a chassis. ConfD includes replication and support for active-standby configurations required in high availability architectures.

- ### Tail-f Systems Capabilities
- Rapid application development
  - CLI, Web, SNMP, and NETCONF interfaces
  - Support for blade and appliance formats
  - High-performance light weight XML database
  - Multi-node transactions
  - Replication and high availability
  - Clustering
  - Enterprise-class security
  - Role-based access control
  - Compact memory footprint

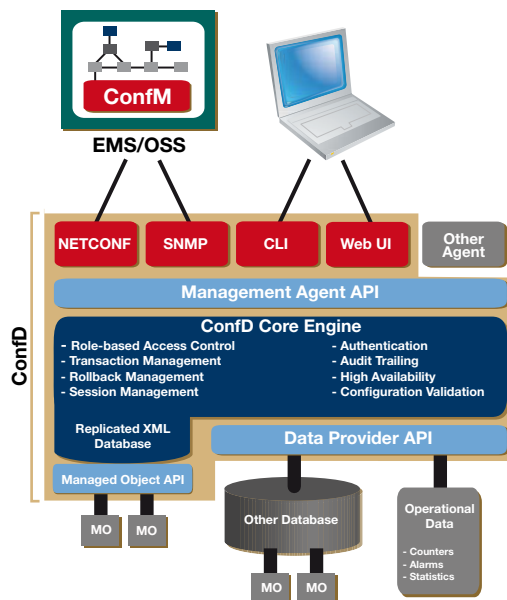


Figure 1: Tail-f Systems Product Overview



## Support for Multi-node Transactions

The management of storage networking platforms is becoming increasingly complex. For example, some configuration changes must be made consistently across multiple devices or managed objects. If the changes are to be made to some but not all devices, the storage network could fail. Transaction management is built into ConfD to address situations where the synchronization of configuration changes is mandatory. With transaction management multiple configuration steps can be made in a single atomic operation and only executed once the system has validated that the changes can be consistently implemented. While this approach was first adopted to enable automated configuration changes to large carrier networks, transaction management is now becoming a requirement in the data center where network outages cannot be tolerated. ConfD supports transaction management across all management interfaces.

## Security and Auditing

Security has become a priority at the highest levels inside an organization. In addition to mitigating threats to mission-critical network systems, IT organizations must also comply with a wide range of regulations. ConfD supports extensive security and auditing as well as robust authorization and authentication systems.

## Role-based Access Control

Where multiple administrators are responsible to manage the same system, role-based access restricts the rights of each administrator according to their function or seniority. ConfD supports fine-grained control of commands and data for every device.

## Clustering Storage Elements Into a Single View

To deliver on the promise of scalable performance, stackable appliances and multi-blade products must have a fast and simple way of configuring added capacity. ConfD enables users to view multiple blades or appliances as if they are a single system and coherently monitor and control them.

## Embedded Systems

ConfD is an XML-based software application that allows storage equipment providers to rapidly build enterprise-class embedded management applications. Developers can choose some or all of the management interfaces supplied with ConfD (CLI, Web, SNMP, and NETCONF) and similarly choose to either use ConfD's database or an existing data store. This flexible product architecture allows ConfD to be used for new projects and as a fast path to augment existing management applications with new functionality. ConfD runs on a wide variety of Linux platforms as well as Solaris and QNX.

Instant NETCONF Agent is a portable software application that allows developers of embedded network management systems to significantly reduce the time and complexity of developing a northbound NETCONF interface.

## Element Management

ConfM is a Java-based software engine that provides developers of EMS/NMS software the capability to extend their applications with a southbound NETCONF interface and intelligent network-wide configuration management functions. When added to an EMS/NMS application, ConfM can work with a variety of embedded NETCONF implementations, including Tail-f's own ConfD and Instant NETCONF Agent.

**tail-f**

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