

Welcome to the World of Standards



Error Handling and Fault Management

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- A vital part of network management is Fault Management
- NFV Fault Management is a #1 priority for network operators in order to be able to assure services and deliver SLAs
- New challenges (and opportunities) for Fault Management arise due to the multi-layer, multi-vendor architecture of NFV
- Network operators need to deploy VNFs from multiple vendors onto a common platform in ways that enable service reliability and availability expectations to be met
- Good Fault Management requires ability to detect and correlate errors and to forward information to operations
- Fault Management and Error handling need to be interoperable between components and between vendors

Fault Correlation – Alternative Schemes

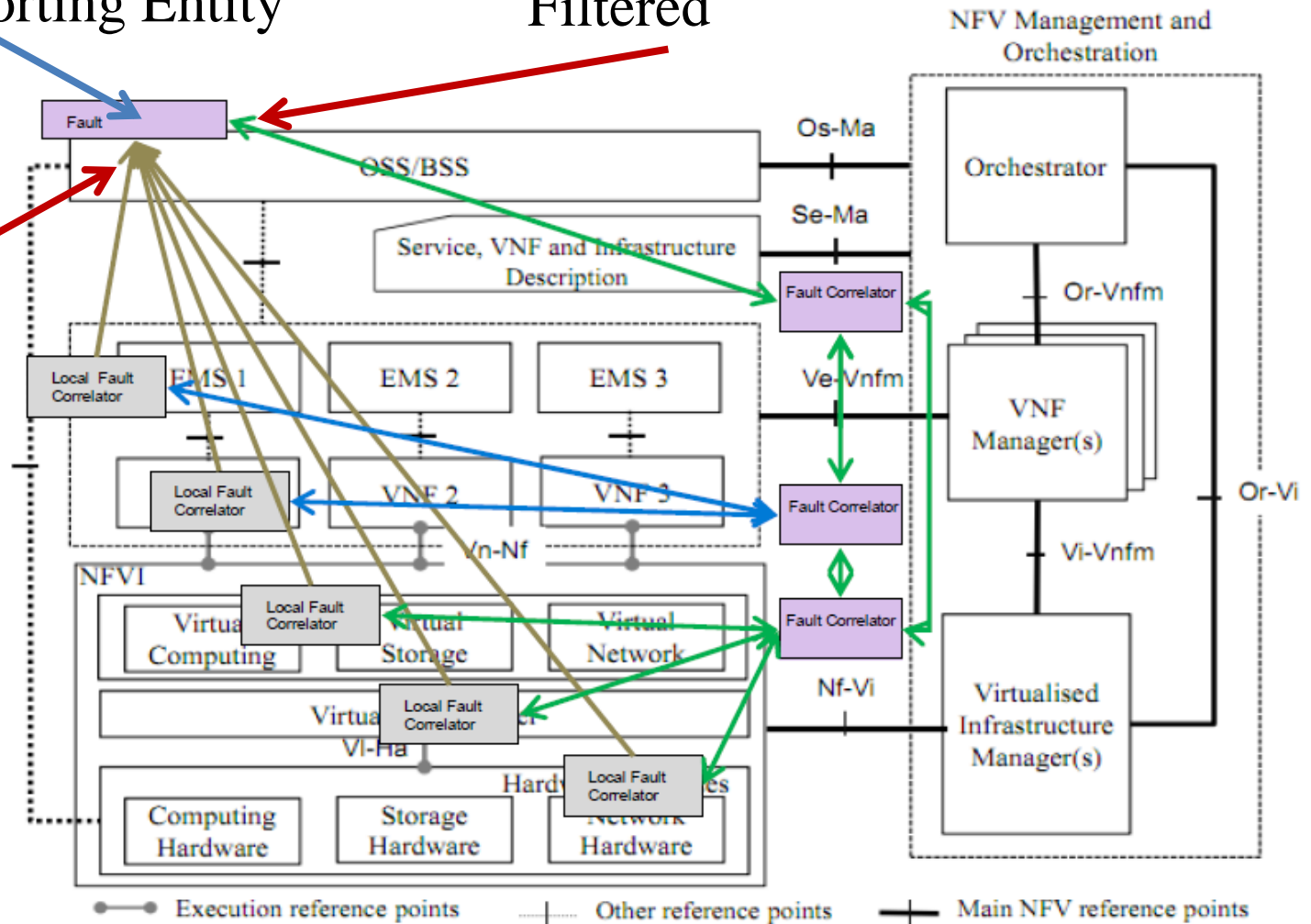
Hierarchical filtering reduces telemetry data volume



Fault Reporting Entity

Filtered

Filtered



- **Successful Fault Management requires error handling in a predictable way**
 - REL008 WI has been created to document the requirements for Error Handling
- **Error Detection**
 - Early detection and handling of errors may avoid failures, hence detected errors should be reported even if they have been resolved locally
- **Notification**
 - Higher layer mechanisms may rely on fast notification (e.g. to trigger failover)
 - If an error event leads to an internal state change, the event as well as the changed state may need to be notified
- **Correlation**
 - Dependencies on failed components may only be apparent at higher layers, hence necessary to identify root cause
 - May need take into account geographical information
 - Different types of messages may be correlated
 - E.g. event notifications, error reports, alarms

• Root Cause Analysis

- Online (real-time) analysis enables fast automatic remediation
 - *Example: A fan problem/failure not yet resulting in violation of temperature limits should lead to migration compliant with affinity rules that may not be known to the underlying infrastructure*
- Offline (non-real-time) analysis requires that proprietary information must be able to be interpreted

• Correlation

- Correlation of data from components originating from different vendors is likely to be required to avoid incompatible recovery actions

• Fault Prediction

- Fault prediction requires that internal errors that did not lead to immediate component failures are reported to higher layer correlation systems
 - *Example: Recoverable memory errors do not lead to component failures. But may be an indicator of a higher risk of failures. Hence replacement of modules/migration to other hardware should be considered*
- Fault prediction analytics would need abstraction of proprietary data formats

REL008 Work Item Plan:

- Stable draft 06/2017
- WG approval 10/2017
- TB approval 11/2017

References

- [NFV-REL001](#) Resiliency requirements
- [NFV-IFA010](#) Functional requirements

For the reference points:

- [NFV-IFA007](#) Or-Vnfm reference point