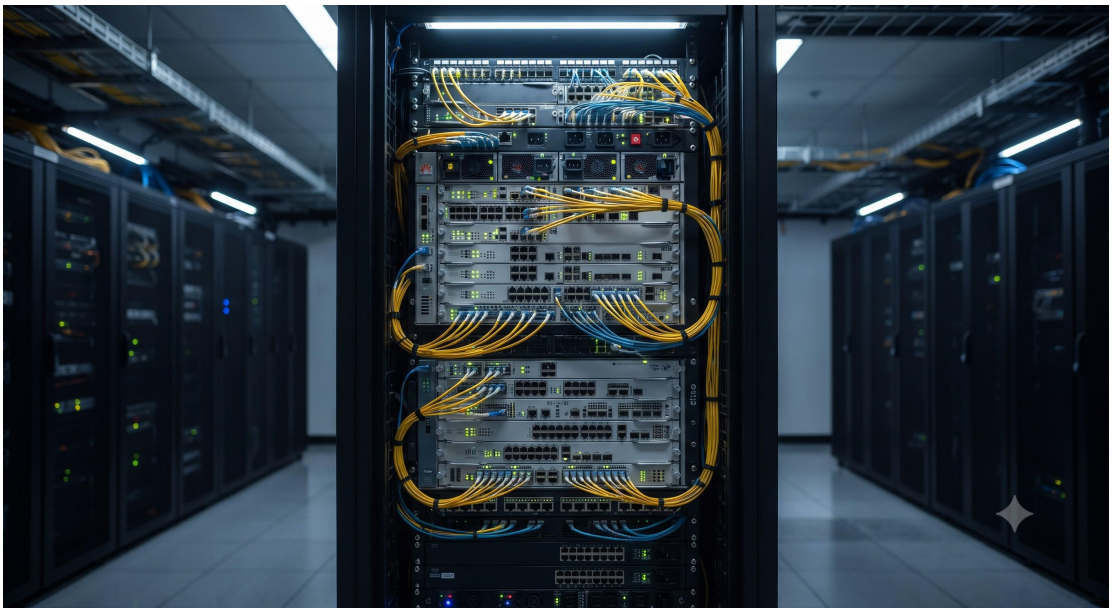
Huawei NetEngine Router to Cisco ASR Core Interconnection MTU Compatibility Guide - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

This document serves as the definitive technical reference for network architects and engineers tasked with interconnecting Huawei NetEngine series routers with Cisco ASR 9000 series core aggregation routers. A primary challenge in such multi-vendor core networks is the disparity in Maximum Transmission Unit (MTU) interpretation and configuration. This guide provides a comprehensive analysis of these differences, detailing the specific impacts on dynamic routing protocol adjacencies and data plane traffic, and furnishes a clear, actionable methodology for achieving seamless interoperability.

By referencing extensive field case studies and internal hardware specifications, this paper clarifies how the Huawei NetEngine and Cisco ASR routers define and process MTU values. It establishes that a failure to reconcile these differences will result in routing protocol neighbor failures (specifically IS-IS), dropped packets for large frames, and suboptimal network performance. This datasheet aims to equip the reader with the necessary knowledge to execute a successful deployment.



HARDWARE ARCHITECTURE & SILICON

The fundamental challenge in Huawei-Cisco MTU interoperability stems from the distinct architectural philosophies and silicon implementations within each vendor's hardware.

Huawei NetEngine Architecture: The Huawei NetEngine platform processes packet forwarding through its NPU (Network Processor) and proprietary forwarding ASICs. Critically, as documented in field analyses, the MTU configuration command (`mtu`) on a NetEngine interface applies to Layer 3 IP packets . This means the specified value dictates the maximum size of the IP payload that can be transmitted. When a frame is constructed, the Layer 2 Ethernet header (typically 14 bytes for standard Ethernet, or larger for QinQ) is added to this Layer 3 MTU to create the total Layer 2 frame size.

Cisco ASR 9000 Architecture: In contrast, the Cisco ASR 9000 Series Router, running IOS XR, has a default behavior where the MTU value configured on a physical interface applies to the Layer 2 Ethernet frame . The Cisco ASR 9000's forwarding engine, built around the Silicon Packet Processor, expects the configured MTU to encompass the entire Layer 2 frame, including the header and the Frame Check Sequence (FCS) . This fundamental difference means that identical numeric MTU values configured on both platforms do not represent the same packet size limit.

KEY FEATURES & ROUTING LOGIC

IS-IS Neighbor Formation: The most common failure mode is the inability to establish an IS-IS neighbor relationship. IS-IS uses padded Hello packets to discover the interface MTU. A mismatch as described above will cause the neighbor relationship to remain in the 'INIT' state or fail entirely, as the larger padded Hello packet from one side will be dropped by the other .

L2VPN & QinQ Encapsulation: The discrepancy is further magnified when deploying L2VPN services, which often utilize 802.1Q or QinQ tags. The Cisco ASR 9000 accounts for these tags automatically. For a standard frame, the default MTU is 1518 bytes, which accommodates a 1500-byte IP payload plus

the 18-byte Ethernet header and FCS. For QinQ (double-tagged) frames, the default MTU is 1522 bytes . The Huaweis configuration, however, will apply its MTU settings to the IP payload. An error by as little as 4 bytes (the size of a VLAN tag) can lead to indiscriminate packet drops .

COMPLIANCE & STANDARDS

This guide is compliant with the following standards and recommendations:

- IEEE 802.3 (Ethernet frame structure)
- IEEE 802.1Q (VLAN tagging)
- ISO/IEC 10589 (IS-IS routing protocol)
- RFC 1191 (Path MTU Discovery)
- RFC 4443 (ICMPv6 for IPv6)

TECHNICAL SPECIFICATIONS

MTU Interpretation Comparison

Platform	MTU Command Context	Default Value (Layer 3)	Frame Inclusion
Huawei NetEngine	Layer 3 IP Packet	1500 Bytes	IP Payload only

| Cisco ASR 9000 | Layer 2 Ethernet Frame | ~1518/1522 Bytes (w/ Tags) | Full L2 Frame + FCS |

Key Interoperability Parameters

- **Protocol Failures:** IS-IS, OSPF (if using large packets)
- **Root Cause:** Incorrect MTU alignment leading to dropped packets
- **Maximum Supported MTU (Huawei):** Up to 9216 Bytes (depending on interface)
- **Maximum Supported MTU (Cisco):** Up to 9216 Bytes

IMPORTANT DEPLOYMENT NOTE

A verified solution from Huawei Support for the CE12800 and ASR9000 interconnection provides key guidance for NetEngine deployments as well :

- **Method 1 (Recommended for New Deployments):** Set the MTU on the Huawei NetEngine interface to be 14 bytes less than the MTU value configured on the Cisco ASR interface. For example, if the Cisco interface is set to `mtu 9126` (for Layer 2 frames), configure the Huawei interface with `mtu 9112`. This accounts for the 14-byte Ethernet header .

- **Method 2 (For Legacy or Complex Environments):** Disable MTU matching for specific routing protocols. On the Huawei side, use the `isis small-hello` command. On the Cisco side, use the `hello-padding disable level 2` command .

Parameter	**Specification**
Platform Compatibility	Huawei NetEngine Series / Cisco ASR 9000 Series
MTU Configuration Difference	Huawei: Layer 3 IP Packet Size\nCisco: Layer 2 Ethernet Frame Size
Recommended Interoperability MTU	Cisco: 9126 Bytes\nHuawei: 9112 Bytes (9126 - 14 Bytes)
Maximum Supported MTU	Up to 9216 Bytes
Common Failure Symptom	Protocol adjacency failure (IS-IS, OSPF) due to dropped Hello packets


LR
LR
SR
SR
SR
LR
LR
LR