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End to end telemetry

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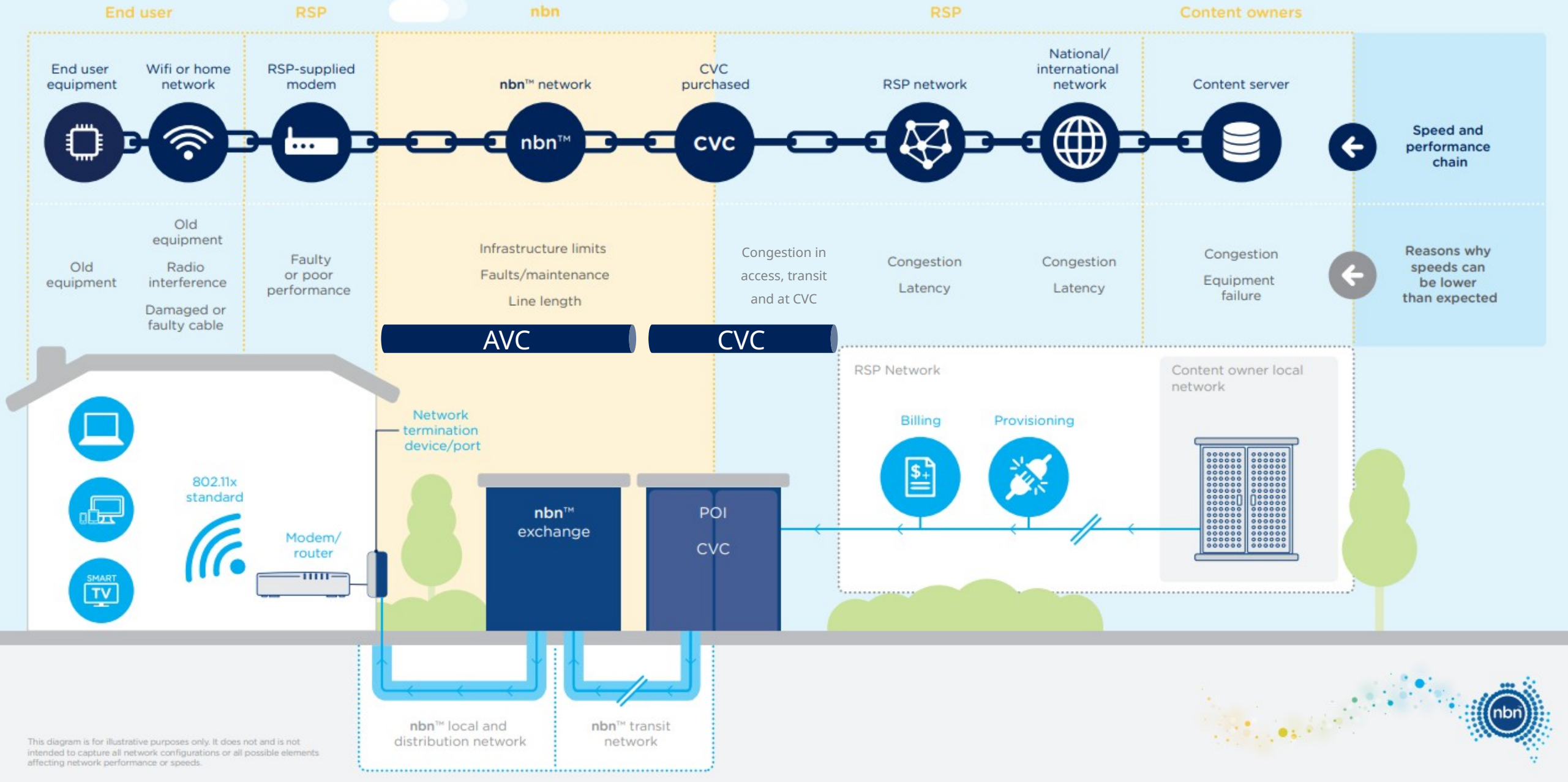
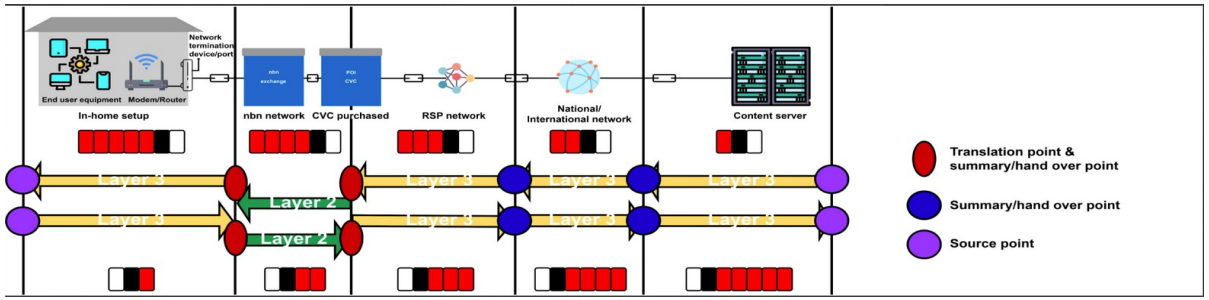
The nbn service chain



This diagram is for illustrative purposes only. It does not and is not intended to capture all network configurations or all possible elements affecting network performance or speeds.

IOAM-L2 Revival

Addressing Layered Telemetry Gaps in L2 wholesale broadband model



Problem:

- As a Layer-2 broadband access wholesale provider, there's a lack of visibility into end-to-end performance for broadband services. Key metrics—delay, delay variation (jitter), and packet loss—can't be fully tracked across all contributing networks required to deliver the full service path. This gap makes it challenging to identify where performance issues originate or how each segment impacts the overall customer experience.
- Today, Layer-2 broadband access wholesale provider allows visibility to the ISP/RSP through B2B interfaces, passing on information about performance. This data may be difficult to relate to performance metrics and delayed, making it challenging to understand performance issues.

RFCs Involved:

- [RFC 9197]: In-situ OAM (IOAM) architecture
- [RFC 9326]: IOAM for IPv6
- Expired Draft: **draft-weis-ippm-ioam-eth** (IOAM over Ethernet)

Specific Problems to Solve

- Current RFCs on Inband Network Telemetry focus on information within a network. There is no exploration of how to use inband network telemetry to pass information **between network providers**.
- The mechanisms for capturing and passing inband network telemetry have focused on L3. There's no guidance on how to pass information **between L3, L2 and vice versa**. (see diagram)

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Rev 1.0 // 14/07/2025

What we learned

The existing IOAM RFCs (e.g., RFC 9197, RFC 9326) do not provide mechanisms for telemetry in Layer 2-only segments, which are prevalent in Australia's broadband architecture.

The draft draft-weis-ippm-ioam-eth that proposed IOAM over Ethernet has expired and lacks current community traction or implementation support.

There is a lack of implementation guidance for:

- Encoding IOAM metadata directly in Ethernet frames.
- Interoperability at L2/L3 boundaries (e.g., bridging telemetry between access switches and IP routers).

Feedback to take to the working group:

- There is a legitimate operational need to monitor and troubleshoot wholesale Layer 2 paths independently of IP-layer telemetry.
- IOAM-L2 capabilities are critical for regulatory compliance, SLA assurance, and fault isolation in national broadband setups.

New work to propose:

- Revive the expired IOAM-L2 draft or introduce a new, modernized version.
- Design a reference architecture for L2 telemetry insertion and collection in mixed-layer deployments.
- Ensure compatibility with existing IOAM mechanisms and IPPM guidelines.

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Next steps

IOAM-L2 was already heading in this direction

Looking for guidance on possible next steps to take:

- Revive the expired IOAM-L2 draft or introduce a new, modernized version.
- Design a reference architecture for L2 telemetry insertion and collection in mixed-layer deployments.
- Ensure compatibility with existing IOAM mechanisms and IPPM guidelines.
- Enable insertion, propagation, and collection of IOAM data directly in Ethernet frames.
- Design metadata that aligns with existing IOAM formats but tailored to L2 operations.
- Use cases sourced from live Australian networks where this network (L3-L2-L3) is already deployed.

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