

在CURWB模式下配置并排除AP的第2层流动性问题

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简介

本文档介绍CURWB设备的第2层流量设置的配置，并提供排除网络故障的指导。

使用的组件

该配置涉及四个不同的硬件组件：

- 思科Catalyst IW9167
- 思科Catalyst IW9165E
- FM4200F
- FM3500

本文档中的信息都是基于特定实验室环境中的设备编写的。用于本文的所有设备从已清除的配置开始。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

什么是流动性？

在CURWB Fluidity中，是一种基于使用多协议标签交换(MPLS)技术来传输IP封装数据的网络架构。

在Cisco超可靠无线回程移动网络场景中，切换过程类似于网络拓扑更改，其中现有链路断开，并建立了新链路。

但是，传统的行业机制用于检测更改和重新配置节点通常速度太慢，而且需要大量数据，无法在高速移动等实时场景下保持最佳性能。

为了应对这些挑战，Fluidity实施了一个快速切换解决方案，该解决方案可提供低至1毫秒延迟的快速路径重新配置。

此主动机制扩展了网络的现有控制平面，利用针对节点MPLS FIB表的特定操作技术。

在流动性方案中，移动节点在相互检测时与轨道侧无线电建立伪线。当车辆沿轨道移动时，它基于各种流动参数从一个轨道侧开始到另一个轨道侧的切换。

这可确保板载客户端设备在整个移动过程中保持其IP地址，并且所有节点都集成到单个第2层网状网络中。

配置流动性：

拓扑：一个IW9167 AP和一个FM3500无线电作为轨道边或路边无线电。这两家公司为车辆提供保险。它们通过以太网电缆连接到核心网络。同时，我们有三辆车。一个FM4200F，一个FM3500，最后一个IW9165E作为车辆。

通过GUI配置第2层流动性：

1. GENERAL SETTINGS > General Mode: IW9167充当CURWB网络的入口/出口点，因此IW9167需要配置为网状终端。其他无线电设备（包括车辆）必须处于网状点模式。

IOTOD IW

Offline

IW-MONITOR

Enabled

FM-QUADRO

GENERAL SETTINGS

- general mode
- wireless radio
- antenna alignment and stats

NETWORK CONTROL

- advanced tools

ADVANCED SETTINGS

- advanced radio settings
- static routes
- allowlist / blocklist
- multicast
- snmp
- radius
- ntp
- ethernet filter
- l2tp configuration
- vlan settings
- Fluidity
- misc settings
- smart license

MANAGEMENT SETTINGS

- remote access
- firmware upgrade
- status
- configuration settings
- reset factory default
- reboot
- logout

GENERAL MODE

General Mode

Select MESH END mode if you are installing this Cisco Catalyst IW9167E Heavy Duty Access Point at the head end and connecting this unit to a wired network (i.e. LAN).

☐ mesh point

Mode: ☒ mesh end

☐ gateway

Radio-off: ☐

LAN Parameters

Local IP: 10.122.136.20

Local Netmask: 255.255.255.192

Default Gateway: 10.122.136.1

Local Dns 1:

Local Dns 2:

Enable IPv6: ☐

Reset

Save

2. GENERAL SETTINGS > Wireless Radio:所有轨道侧和车辆无线电需要共享相同的共享口令、频率和信道宽度。

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WIRELESS RADIO

Wireless Settings

"Shared Passphrase" is an alphanumeric string or special characters excluding '[apex]' '[double apex]' '[backtick]' '\$[dollar]' '=' '[equal]' '\[backslash]' and whitespace (e.g. "mysecurecamnet") that identifies your network. It MUST be the same for all the Cisco URWB units belonging to the same network.

Shared Passphrase:

Show passphrase: ☒

In order to establish a wireless connection between Cisco URWB units, they need to be operating on the same frequency.

Radio 1 Settings

Role:

Frequency (MHz):

Channel Width (MHz):

Radio 2 Settings

Role:

Reset

Save

3. 高级设置>流动性：为车辆提供覆盖的轨道旁无线电需要配置为基础设施。另一方面，车辆无线电需要配置为车辆。



ULTRA RELIABLE
WIRELESS BACKHAUL

Cisco URWB IW9167EH Configurator

5.246.2.0 - MESH END MODE

IOTOD IW

Offline

IW-MONITOR

Enabled

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FLUIDITY

Fluidity Settings

The unit can operate in 3 modes: Infrastructure, Infrastructure (wireless relay), Vehicle.

The unit must be set as Infrastructure when it acts as the entry point of the infrastructure for the mobile vehicles and it is connected to a wired network (backbone) which possibly includes other Infrastructure nodes. The unit must be set as Infrastructure (wireless relay) ONLY when it is used as a wireless relay agent to other Infrastructure units. In this operating mode, the unit MUST NOT be connected to the wired network backbone as it will use the wireless connection to relay the data coming from the mobile units.

The unit must be set as Vehicle when it is mobile. Vehicle ID must be set ONLY when the unit is configured as Vehicle. Specifically, Vehicle ID must be a unique among all the mobile units installed on the same vehicle. Unit installed on different vehicles must use different Vehicle IDs.

The Network Type filed must be set according to the general network architecture. Choose Flat if the mesh and the infrastructure networks belong to a single layer-2 broadcast domain. Use Multiple Subnets if they are organized as different layer-3 routing domains.

Unit Role: Infrastructure

Network Type: Flat

The following advanced settings allow to fine-tune the performance of the system depending on the specific environment. Please do not alter this settings unless you have read the manual first and you know what you are doing.

The Handoff Logic controls the algorithm used by a mobile radio to select the best infrastructure point to connect to. In Normal mode, the point providing the strongest signal is selected. In Load Balancing mode, the mobile radio prefers the point which provides the best balance between signal strength and amount of traffic carried.

Handoff Logic: Standard

Reset

Save

IOTOD IW

Offline

IW-MONITOR

Enabled

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The Network Type field must be set according to the general network architecture. Choose Flat if the mesh and the infrastructure networks belong to a single layer-2 broadcast domain. Use Multiple Subnets if they are organized as different layer-3 routing domains.

Unit Role:

Automatic Vehicle ID: ☒ Enable

Network Type:

The following advanced settings allow to fine-tune the performance of the system depending on the specific environment. Please do not alter this settings unless you have read the manual first and you know what you are doing.

The Handoff Logic controls the algorithm used by a mobile radio to select the best infrastructure point to connect to. In Normal mode, the point providing the strongest signal is selected. In Load Balancing mode, the mobile radio prefers the point which provides the best balance between signal strength and amount of traffic carried.

Handoff Logic:

Reset

Save

4. Advanced Settings > Advanced Radio Settings:使用2x2 MIMO时，选择ab-antenna作为天线编号。

- 对于IW9167，如果使用带接口1的2x2 MIMO，请连接到天线端口3和4。如果为接口2配置，请使用天线端口5和6。
- 对于IW9165D，接口1具有内置天线。如果连接外部天线，请使用接口2。

IOTOD IW Offline
IW-MONITOR Enabled
FM-QUADRO

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ADVANCED RADIO SETTINGS

Radio 1

FluidMAX Management

Force the FluidMAX operating mode of this unit. If the operating mode is Primary/Secondary a FluidMAX Cluster ID can be set. If the FluidMAX Autoscan is enabled, the Secondary units will scan the frequencies to associate with the Primary with the same Cluster ID. In this case, the frequency selection on the Secondaries will be disabled.

Radio Mode: OFF

Max TX Power

Select the max power level that the radio shall use to transmit (power level 1 sets the highest transmit power). The Cisco URWB TPC (Transmit Power Control) will automatically select the optimum transmission power according to the channel condition while not exceeding the MAX TX Power parameter. Note: In Europe TPC is automatically enabled.

Select TX Max Power: 1

Antenna Configuration

Select radio 1 antenna gain and antenna number.

Select Antenna Gain: UNSELECTED

Antenna number: ab-antenna

Data Packet Encryption

Enable AES to cypher all wireless traffic. This setting must be the same on all the Cisco URWB units.

Enable AES: Disabled

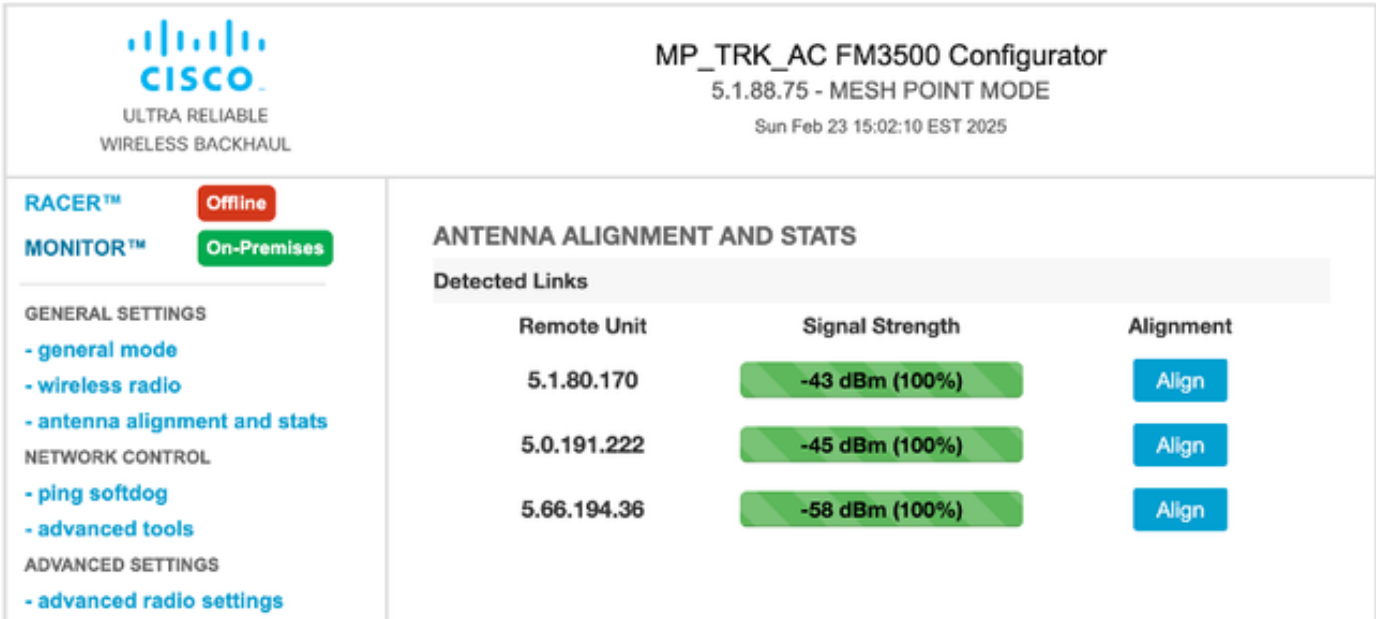
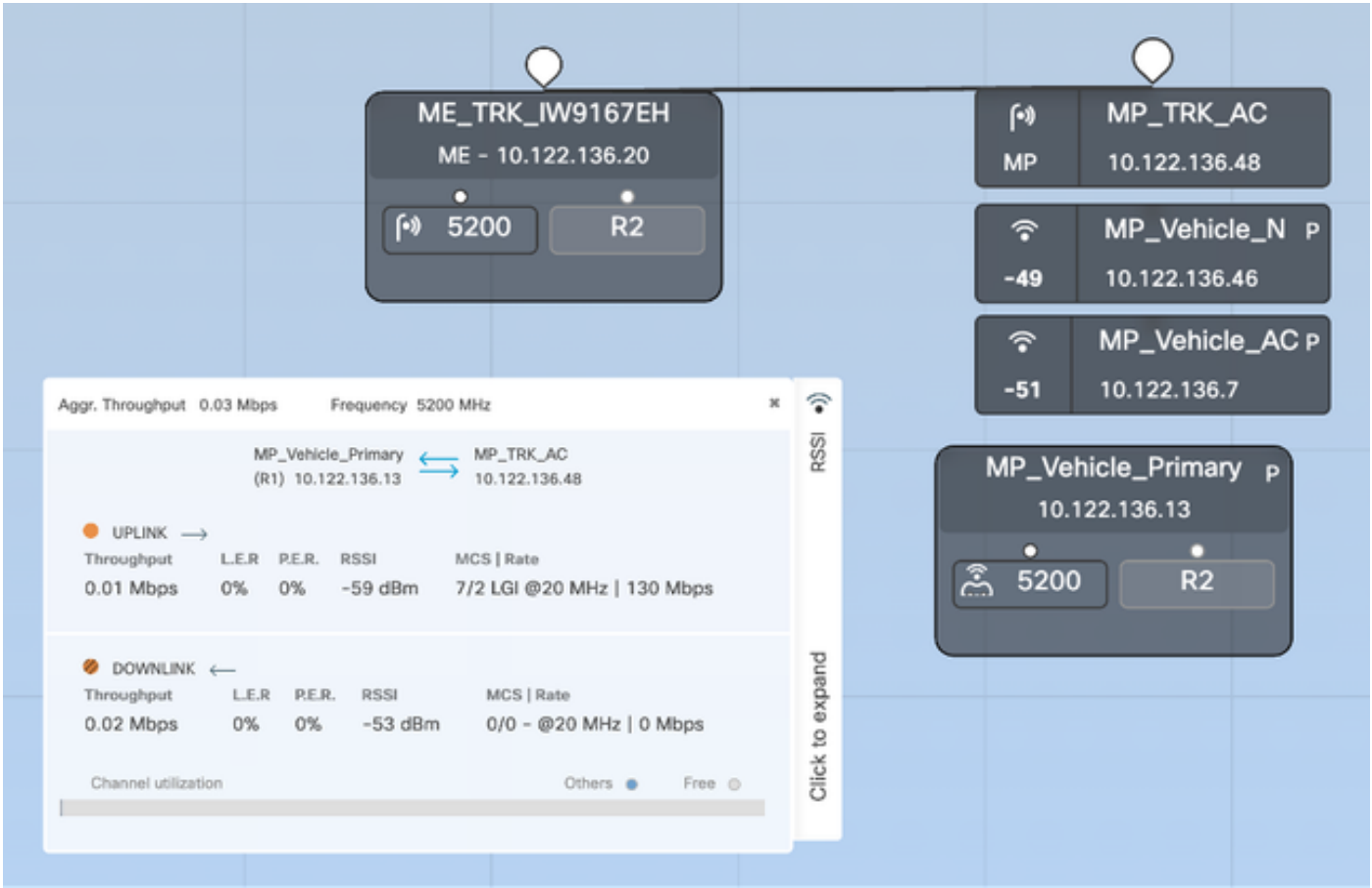
Maximum link length

Insert the length of the longest link in the net, or let the system select an optimal value.

Distance: 3

Unit: ☒ Km ☐ Miles

- 正在完成配置：配置完所有设置后，保存配置并应用更改。无线接入点(AP)重新启动且无线电重新联机后，您可以从Antenna Alignment页面检查RSSI，并从FM-Quadro页面监控实时连接。



通过CLI配置第2层流动性：

跟踪端配置：

```
ME_TRK_IW9167EH#configure modeconfig mode meshend
```

Note: Tracksides other than mesh end needs to be configured as “meshpoint”

```
ME_TRK_IW9167EH#configure ap address ipv4 static IP NETMASK GATEWAY DNS1 DNS2
ME_TRK_IW9167EH#configure dot11Radio 1 frequency 5180
ME_TRK_IW9167EH#configure dot11Radio 1 bandwidth 20
ME_TRK_IW9167EH#configure wireless passphrase URWB
ME_TRK_IW9167EH#configure dot11Radio 1 mode fluidity
ME_TRK_IW9167EH#configure fluidity id infrastructure
ME_TRK_IW9167EH#write
ME_TRK_IW9167EH#reload
```

车辆配置：

```
MP_V_IW9165E#configure modeconfig mode meshpoint
MP_V_IW9165E#configure ap address ipv4 static IP NETMASK GATEWAY DNS1 DNS2
MP_V_IW9165E#configure dot11Radio 1 frequency 5180
MP_V_IW9165E#configure dot11Radio 1 bandwidth 20
MP_V_IW9165E#configure wireless passphrase URWB
MP_V_IW9165E#configure dot11Radio 1 mode fluidity
MP_V_IW9165E#configure fluidity id vehicle-auto
MP_V_IW9165E#write
MP_V_IW9165E#reload
```

故障排除流动性：

在移动/流动性应用中，可能会出现各种问题，例如低于预期的吞吐量、间歇性连接、延迟挑战和干扰。

信号强度的物理问题：

- 确保使用支持CURWB的天线，按照建议的准则正确连接到无线电，且方向正确。
- 确认覆盖范围在整个路径内已足够。
- 保持无线电的直视范围。

高信道利用率：

- 通过战略射频规划减少干扰。
- 利用具有频率扫描的多频率部署实现无缝切换，每辆车需要两个无线电。
- 确保无线电在相同高度上至少相距10英尺，并且同一极上的无线电之间至少保持3英尺以避免来自附近设备的干扰。

吞吐量问题:

吞吐量问题可能由多个因素引起：

- 强大的信号强度对最佳吞吐量至关重要；较弱信号会降低调制速率和吞吐量。目标为信号强度介于-45 dBm和-70 dBm之间。

- 高信道利用率也会导致吞吐量降低。

延迟问题：

延迟问题（特别是在敏感应用中）可能是由于：

- 沿轨道信号强度不足。
- 干扰影响频率性能。
- 无线电设备和交换机上需要服务质量(QoS)配置。
- 需要根据PLC配置进行验证和微调的流动性设置。

故障排除工具：

IW监控器是一种用于监控网络流动性的重要工具。发生故障时，可利用有关RSSI、抖动、延迟、LER和PER的历史数据来诊断根本原因。

关于此翻译

思科采用人工翻译与机器翻译相结合的方式将此文档翻译成不同语言，希望全球的用户都能通过各自的语言得到支持性的内容。

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