配置点对点(PMP)超可靠无线回传(URWB)网络并 排除故障

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简介

本文档介绍为思科超可靠无线回传(CURWB)建立点对点拓扑,它提供使用网络用户界面(UI)配置点 对多点(PMP)超可靠无线回传(URWB)网络并对其进行故障排除的分步指南。



先决条件

使用的组件

- 1.1台笔记本电脑/PC
- 2.4个PoE馈电器24VDC(FM-POE-STD)
- 3. 1个PoE馈电器48VDC(FM-POE-STD-GBIT)/PoE交换机
- 4. 4x Fluidmesh收发器作为从设备(本文使用FM1200V),可以从与父无线电相关的2个从属无 线电开始创建点到多点网络。
- 5.1x Fluidmesh收发器用作父收发器(本文使用FM3200)

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。本文档中使用的所有设备最初均采用原 始(默认)配置。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。

配置

网络图

位于汇聚点(通常最靠近核心网络)的无线电设置为主无线电或网状终端。网状终端充当 Fluidmesh无线网络和有线核心网络之间的网关。

网状点用作远程/从属无线电,通常指回网状端或另一网状点(如果是PMP),则它指回网状端



可以在以下设备上配置点到多点(PMP):FM1200、FM3200E、FM3200B、FM4200M、FM4200F、 FM3500E、FM4500M和FM4500F

在本示例中,不使用带宽插件,因此FM3200B的带宽上限为15MB,FM1200V的带宽上限为2MB。

配置

1. 打开无线电设备的盒子,并按照图中所示为其供电:



PoE馈电器上的LAN端口进入终端设备(PC/笔记本电脑),PoE馈电器上的PoE端口进入 FM1200V/FM3200B上的LAN1端口

在开始配置之前,请确保对所有无线电执行固件升级到最新固件版本。

2. 使用默认凭证(admin/admin)登录父无线电的Web UI,默认IP地址为192.168.0.10/24

New Tab	× 🔼
$\ \ \leftrightarrow \ \ G$	192.168.0.10
	🗅 192.168.0.10 - Fluidmesh VOLO - 0-35-140
	9 192.168.0.10 - Google Search

 当无线电首次打开时,将显示许可证协议以及选择国家/地区的选项。您必须阅读并接受许可 协议,并选择部署无线电的国家/地区。选择不正确的国家/地区可能会使设备不合法。接受许 可协议后,用户可以决定是使用传统网络界面还是使用向导网络界面配置设备。

- 4. 选择"classic",使用基于Web的传统界面手动配置参数。
- 5. 在父无线电(FM3200B)上,导航至"常规"模式,然后选择"网状结束"作为模式,

在打开和配置远程无线电之前,请确保更改无线电的IP地址/网络掩码。例如,10.0.0.1/24。完成后 ,单击"保存"。

alaha	Tower-1-D1-XXX 3200 Configurator		
CISCO	5.0.41.146 - MESH END MODE		
ULTRA RELIABLE	FIPS 140-2 MODE ENABLED		
WIRELESS BACKHAUL	Tue Jul 5 13:44:01 CEST 2022		
RACER ¹¹⁴ Offline	CENERAL MORE		
MONITOR ^{IN} On-Premises	GENERAL MODE		
	General Mode		
FM-QUADRO**	Select MESH END mode if you are installing this Tower-1-D1-XXX 3200 at the head end and connecting this unit to a wired network (i.e. LAN).		
GENERAL SETTINGS		O bridge	
- general mode	Mode: mesh point		
- wireless radio	mode. O mean point		
- antenna alignment and stats	mesh end		
- spectral analysis	Prodigy Version		
NETWORK CONTROL	Select the Prodigy protocol version. Please note the Prodigy 1.0 is NOT compatible with Prodigy 2.0. Please make sure to use the same Prodigy version for the entire network.		
- ping softdog	O Prodiav 10		
- advanced tools	Protocol: Prodigy 1.0		
ADVANCED SETTINGS	Proagy 2.0		
- advanced radio settings	LAN Parameters		
- ethernet settings	Local IP:	10.0.0.1	
- static routes			
- whitelist / blacklist	Local Netmask:	255.255.255.0	
- multicast			
- snmp	Default Gateway:		
- radius	Local Dos 1:		
- ntp	Local Dilo 1.		
- 12tp configuration	Local Dns 2:		
- vlan settings			
- Fluidity TM			
- misc settings	Reset	Save	
MANAGEMENT SETTINGS			
- view mode settings			
- remote access			

6. 导航至"无线电"(在"常规设置"下)。在此页面中,用户可以设置无线电以在295个载波频率中的任意频率上运行,并设置5 MHz之间的信道宽度(对于吞吐量较低的链路)或40 MHz(对于高吞吐量链路)。

ULTRA RELIABLE WIRELESS BACKHAUL	Tower-1-D1-XXX 3200 Configurator 5.0.41.146 - MESH END MODE FIPS 140-2 MODE ENABLED Tue Jul 5 13:46:08 CEST 2022	
RACER™ Offline MONITOR™ On-Premises	WIRELESS RADIO	
FM-QUADRO TM	Wireless Settings "Shared Passphrase" is an alphanumeric string (e.g. "mysecurecamnet") that indentifies your network. It MUST	
GENERAL SETTINGS - general mode - wireless radio - antenna alignment and stats - spectral analysis	be the same for all the FM units belonging to the same network. Shared Passphrase: fluidmesh Country: UNITED STATES In order to establish a wireless connection between FM units, they need to be operating on the same frequency.	
- ping softdog	Radio Settings	
 advanced tools ADVANCED SETTINGS advanced radio settings ethernet settings static routes whitelist / blacklist multicast snmp 	Frequency (MHz): 5700 V Channel Width (MHz): 40 V Reset Save	

从信道宽度为40MHz的列表中选择信道宽度ex为5700MHz的频率,并确保本地和远程无线电共享相同的密码短语、频率/信道宽度,并且它们位于同一子网中,一旦完成,请单击"保存"。

宽度	数据传输速度	吞吐量
5 MHz	37 Mbps	20 Mbps
10MHz	75 Mbps	45 Mbps
20MHz	150 Mbps	90 Mbps
40MHz	300 Mbps	150-190 Mbps
80MHz	866 Mbps	500 Mbps**

所述吞吐量处于理想状态。实际吞吐量可能因环境条件而异。

*使用FM1200V和千兆插件的150Mbps。190Mbps(使用FM3200/4200/3500/4500系列)。

**仅在使用FM3500/4500系列时为500Mbps。

7. 导航至"高级无线电设置",将无线电模式设置为"MASTER"(FluidMAX集群ID为"1"),然后调整传输功率,目标是使信号强度在-45dBm和-55dBm之间,完成后,单击"保存"。

	Tower-1-D1-XXX 3200 Configurator	
CISCO.	FIPS 140-2 MODE ENABLED	
WIRELE connected to dashboard	Tue Jul 5 13:50:26 CEST 2022	
RACER™ Server.	ADVANCED RADIO SETTINGS	
MONITOR ¹¹⁴ On-Premises	FluidMAX TM Management	
M-QUADRO™	Encounter in EluidMAYIN operation mode of this unit. If the operation mode is Master/Since a EluidMAY Cluster ID	
ENERAL SETTINGS	can be set. If the FluidMAX Autoscan is enabled, the Slave units will scan the frequencies to associate with the Master with the same Cluster ID. In this case, the frequency selection on the Slaves will be disabled.	
general mode	Radio Mode: MASTER V	
wireless radio		
antenna alignment and stats	FluidMAX Cluster ID: 1	
spectral analysis	Max TX Power	
ETWORK CONTROL	Select the max power that the radio shall use to transmit. The Fluidmesh TPC (Transmit Power Control) will	
ping softdog	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.	
advanced tools	Select TX Max Power: AUTO	
DVANCED SETTINGS		
advanced radio settings	Select Antenna Gain: NOT SELECTED V	
ethernet settings	Parts Particul Ensuration	
static routes	Data Packet Encryption	
whitelist / blacklist	Enable AES to cypher all wireless traffic. This setting must be the same on all the Fluidmesh units.	
multicast	Eachie AES: Dischlad	
snmp	Enable AES: Disabled	
radius	Maximum link length	
ntp	Insart the length of the longest link in the net or lat the surtern relact an optimal value	
12tp configuration	maant uite verigen of one kongreat mit in one net, of let uite system serect an optimal value.	
vlan settings	Automatic: 🗹	
Fluidity TM	Distance	
misc settings	Laborative.	
ANAGEMENT SETTINGS	Unit: 💿 Km 🔘 Miles	
view mode settings		
emote access		
firmware upgrade	Cancel Save	
manage plug-ins		

8. 当用户对页面进行更改并点击Save时,页面顶部会显示一条消息,说明在完成对此单选按钮 的所有更改之前,您不必"应用"更改。 在每页上点击Save。 当然,用户也可以"放弃"或"审核 "所有更改。配置常规设置(常规模式和无线电)后,应用导致无线电重新启动的配置。

9.使用默认凭证(admin/admin)登录第一个从属无线电的Web UI,默认IP地址为192.168.0.10/24

- ⇒ C	192.168.0.10
	192.168.0.10 - Fluidmesh VOLO - 0-35-140
	9 192.168.0.10 - Google Search

10.选择"classic",使用基于Web的传统界面手动配置参数。

11.在从属无线电(FM1200V)上,导航至"常规"模式并选择"网状点"作为模式,完成后单击"保存"

CER TH Offline			
ONITOR ^{IN} On-Premises	GENERAL MODE		
	General	I Mode	
I-QUADRO	Select MESH POINT mode if you are attaching an IP edg Tower-1-D1-XXX 3200 or if you are using this unit as a re	ge device (i.e. network camera, encoder, etc.) to this slay point in the mesh network.	
NERAL SETTINGS		O bridge	
eneral mode	Mode:	mesh point	
reless radio		O mesh end	
tenna alignment and stats	Proting	Version	
ectral analysis	Prodigy	Prodigy Version	
WORK CONTROL	make sure to use the same Prodigy version for the entire	Select the Prodigy protocol version. Please note the Prodigy 1.0 is NOT compatible with Prodigy 2.0. Please make sure to use the same Prodigy version for the entire network.	
ing softdog		O Prodigy 1.0	
dvanced tools	Protocol:	Prodicy 2.0	
ANCED SETTINGS	14110-	- Frongy 2.0	
vanced radio settings	LAN Par	LAN Parameters	
ernet settings	Local IP:	10.0.0.2	
tic routes			
itelist / blacklist	Local Netmask:	255.255.255.0	
ilticast			
mp	Default Gateway:		
dius			
P	Local Dns 1:		
p configuration	Local Dec A		
in settings	Local Dris 2:		
aidity™			
ac settings	Read	Reue	
AGEMENT SETTINGS	Reset	Save	
w mode settings			
mote access			
rmware upgrade			

12.导航至"高级无线电设置",将无线电模式设置为"SLAVE",FluidMAX集群ID为"1",并禁用 FluidMAX自动扫描。最后,调整传输功率,目标是使信号强度在–45dBm和–60dBm之间,一旦完 成,单击"保存"。

RACER™ Offline	ADVANCED RADIO SETTINGS		
MONITOR ¹⁸ On-Premises	FluidMAX [™] I	Management	
FM-QUADRO™ GENERAL SETTINGS	Force the FluidMAX TM operating mode of this unit. If the can be set. If the FluidMAX Autoscan is enabled, the Sia Master with the same Cluster ID. In this case, the frequer	operating mode is Master re units will scan the freq ncy selection on the Slaw	Slave a FluidMAX Cluster ID uencies to associate with the es will be disabled.
- general mode	Radio Mode:	SLAVE	~
- wireless radio			
- antenna alignment and stats	FluidMAX Cluster ID:	1	
- spectral analysis	FluidMAX Autoscan:		
NETWORK CONTROL	Max TV	Bower	
- ping softdog	max 1A	The Electronic TDC (Tre	anamit Dawar Castroll will
- advanced tools	Select the max power that the radio shall use to transmit. The Fluidmesh TPC (Transmit Power Control) will automatically select the optimum transmission power according to the channel condition while not exceeding the		ndition while not exceeding the
ADVANCED SETTINGS	MAX TX Power parameter. Note: in Europe TPC is autor	natically enabled.	
- advanced radio settings	Select TX Max Power:	AUTO	\sim
- ethernet settings	Salast Astansa Cais	NOT RELECTED	
- static routes	Select Antenna Gain:	NOT SELECTED	~
- whitelist / blacklist	Data Packet	Encryption	
- multicast	Enable AES to cypher all wireless traffic. This setting mu	st be the same on all the	Fluidmesh units.
- snmp			
- radius	Enable AES:	Disabled	\sim
- ntp	Maximum	ink length	
12tp configuration	maximum iink iength		
vian settings	Insert the length of the longest link in the net, or let the system select an optimal value.		
- Fluidity**	Automatic:	Image: A start and a start	
- misc settings			
MANAGEMENT SETTINGS	Distance:		
view mode settings	Unit: O Km O Miles		
remote access		un - miles	
- firmware upgrade			_
- manage plug-ins	Cancel	Save	
- status			

13.导航至"无线无线电"(在"常规设置"下),并将fluidmesh写为通道宽度为40MHz的密码短语和列 表中的5700MHz

RACER™ Offline	WIRELESS RADIO	
FM-QUADRO TM	Wireless Settings "Shared Passphrase" is an alphanumeric string (e.g. "mysecurecamnet") that indentifies your network. It MUST	
GENERAL SETTINGS - general mode	Shared Passphrase: fluidmesh	
- wireless radio - antenna alignment and stats - spectral analysis	Country: UNITED STATES \checkmark	
NETWORK CONTROL	In order to establish a wireless connection between FM units, they need to be operating on the same frequ Radio Settings	
- advanced tools ADVANCED SETTINGS	Frequency (MHz): 5700 V	
- advanced radio settings - ethernet settings	Channel Width (MHz): 40 V	
- static routes - whitelist / blacklist - multicast	Reset Save	

14.应用导致无线电重新启动的配置。

Configuration contains changes. Apply these changes? Apply Discard Review

15.对其余从属无线电应用相同的配置,即重复从9到14的步骤。

确保远程无线电与其余设备的IP地址不同,例如10.0.0.0/24。

16.重新启动无线电后,这些边界节点必须与父无线电关联。

验证

使用FMQuadro或从SSH验证和监控网络性能是可能的

使用SSH

使用管理员凭证通过SSH连接到网状终端无线电并发出命令:

使用eng-stats命令,

admin@5.0.197.82:~# eng-stats Kbps: Total Rx Tx LAN: 149 99 50 WLAN: 216 93 123 WLAN Rx: 00:F1:CA:98:43:78 rate 30 mcs 8 mcs-flags HT40/SGI snr 17 rssi -79 received 211787636 bytes 1932195071 evm 0 0 00:F1:CA:80:50:4D rate 120 mcs 11 mcs-flags HT40/SGI snr 48 rssi -48 received 135646707 bytes 3125323538 evm 12 7 00:F1:CA:80:FF:F0 rate 104 mcs 5 mcs-flags HT20/LGI snr 51 rssi -45 received 150804029 bytes 4159888305 evm 0 0 00:F1:CA:80:FF:F1 rate 180 mcs 12 mcs-flags HT40/SGI snr 53 rssi -43 received 150203220 bytes 20690087 evm 21 18 WLAN TX: 00:F1:CA:98:43:78 rate 121 mcs 6 mcs-flags HT40/LGI sent 595488961 failed 454692 bytes 3760693302 retries 601037384 LER 0% PER 0%

00:F1:CA:80:50:4D rate 130 mcs 7 mcs-flags HT20/LGI sent 186838807 failed 107515 bytes 3382563410 retries 101489415 LER 5% PER 0% 00:F1:CA:80:FF:F0 rate 144 mcs 7 mcs-flags HT20/SGI sent 245178544 failed 115850 bytes 513275349 retries 79286256 LER 0% PER 0% 00:F1:CA:80:FF:F1 rate 135 mcs 7 mcs-flags HT40/LGI sent 232129895 failed 121325 bytes 3559511458 retries 91496365 LER 1% PER 0%

Ethernet 1 role: mesh Ethernet 2 role: down admin@5.0.197.82:~#

在此,您可以监控网状端和网状点之间所有无线链路的当前状态、链路错误率(LER)、数据包错误 率(PER)以及以太网和无线的当前吞吐量

使用FMQuadro

点击表示网状端和网状点之间无线连接的蓝色线,您将获得无线链路运行状况和当前吞吐量的概述

Aggr. Throughput 0.03 Mbps	Frequency 5580 MHz Mode TDMA X
Testa 1	$\frac{\text{DedFixPl}}{0.0.0.1} \longleftrightarrow \frac{\text{Trailer-4-D1}}{10.0.0.2}$
 UPLINK → Throughput L.E.R P.E.F 0 Mbps 0% 	R. RSSI MCS Rate -49 dBm 5/1 LGI @20 MHz 52 Mbps
 DOWNLINK ← Throughput L.E.R P.E.F 0.03 Mbps 3% 0% Channel utilization 	R. RSSI MCS Rate -50 dBm 7/1 LGI @40 MHz 135 Mbps Others • Free •

٦

故障排除

隐藏节点问题

当网状点可以与网状端通信,但无法直接与与网状端通信的其他网状点通信时,就会出现隐藏终端 问题。这在介质访问控制子层中造成了困难,因为多个无线电设备可以同时向网状端发送数据包 ,这在网状端造成干扰,导致数据包无法通过。

当集群上启用fluidmax时,可能会发生此问题,Fluidmax是思科开发的一项正在申请专利的技术 ,它允许支持所有不同的网络(网状网络/P2MP)架构,而无需任何硬件更改或手动软件配置。设 备自动检测正在使用的架构,从而配置和调整通信协议以最好地支持部署的拓扑。例如,如果检测 到点对多点设置,待申请专利的FluidMAX系统自动选择网络中的最佳父单元并将其它设备配置为从 属节点。用户无需手动配置主设备和从设备角色,网络中不同角色不需要不同的硬件。这种独特的 Fluidmesh功能使Fluidmesh成为您从简单的点对点链路到城市网状部署的任何无线需求的一站式服 务。

要解决隐藏的终端问题,请按照步骤7和12所述,在高级无线电设置中将网状终端配置为 "MASTER",网状点配置为"SLAVE"

禁用令牌跟踪器

当网格点与网格端的连接性差时,网格端会在一段时间内阻塞该网格点,因此其余网格点的性能不 会下降。要关闭此功能,以便不允许网状端阻止任何网状点,您需要在网状端发出以下命令来禁用 令牌跟踪器

fluidmax tktrk disable

重新启动

通过发出此命令,可以检查当前是否阻止或之前是否阻止了网状点,然后验证第8列{blocked}

fluidmax信息

admin95.0.197.82:-# fluidmax info IP 3.0.197.82 Master: 3.0.197.82 Version: 9 Working State: P2MP_MASTER Tower ID: 0 Master Tower ID 0 neigh 3.0.255.240 mac 00:F1:CA:80:FF:F0 age 0.135168075 ett 306 rssi 50 to_id 0 master 3.0.197.82 count 0 version 9 state P2MP_SLAVE 3.0.255.241 3.0.80.77 3.8.197.82 3.24.67.128 neigh 3.0.255.241 mac 00:F1:CA:80:FF:F1 age 0.134301002 ett 306 rssi 51 to_id 0 master 3.0.197.82 count 0 version 9 state P2MP_SLAVE 3.24.67.120 3.0.80.77 3.0.197.82 3.0.255.240 neigh 3.24.67.120 mac 00:F1:CA:98:43:78 age 0.047123860 ett 306 rssi 14 to_id 0 master 3.0.197.82 count 0 version 9 state P2MP_SLAVE 3.0.255.240 3.0.255.241 3.0.80.77 3.0.197.82 neigh 3.0.80.77 mac 00:F1:CA:80:50:4D age 0.063013778 ett 306 rssi 47 to_id 0 master 3.0.197.82 count 0 version 9 state P2MP_SLAVE 3.0.197.82 3.0.255.241 3.0.255.240 3.24.67.128 (Addr) (DLGrant KB) (TXRATE Mbps) (ULGrant KB) (RXRATE Mbps) (Version) (Antenna) (Blocked) 00-F1-CA-80-FF-F0 ø 133 ø 186 9 8 0/0 00-F1-CA-80-FF-F1 ë 97 9 0/0 ø 166 8 00-F1-CA-98-43-78 133 28 0/0 e ø 9 0 00-F1-CA-80-50-4D ø 118 ø 189 9 ø 0/0 Round Time: 10000 us admin95.0.197.82:-#

请注意,这需要重新启动网状端。

写