

How-To Guide: Setup a 4.2.x HA Redundant WAN Inband Management Router from Scratch

Abstract

The guide will walk an operator through setting up a typical highly availability branch or headend router with redundant WAN interfaces and inband management using the 128T certified OTP (one touch provisioning) ISO.

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Introduction

The guide will walk an operator through setting up a typical HA branch or datacenter edge router using the 128T certified OTP (one touch provisioning) ISO.

Intended Audience

This guide is intended to be used by implementation engineers for both internal and external (customer) consumption.

Prerequisites

- Tested on 128T-OTP-4.2.0-2.el7.x86_64.iso OTP ISO with the 128T Conductor running 4.2.0-2.
- Bootable ISO created following this procedure: <u>https://community.128technology.com/viewdocument/how-to-create-a-boota</u> <u>ble-usb-device-for-the-128t-iso-in-windows?CommunityKey=b11feb44-9c9c-4</u> <u>d2a-bfa2-63e8826d0d0a&tab=librarydocuments</u>
- BIOS configured to boot off of USB drive first
- Installed system meets minimal 128T hardware requirements
- 128T Router is fully managed by 128T standalone Conductor
- 128T Router deployed as 2 nodes in a highly available pair
- 128T Router has 2 WAN links with each shared across both nodes for redundancy
- Management plane setup to use shared WAN1 and WAN2 connections (e.g. inband) and setup with a static IPv4 address
- If 128T is not running, WAN1 will be used to connect to Conductor from each node. This requires 3 IPs to be used as follows:
 - IP1: shared IP when 128T is running
 - IP2: node1 WAN IP when 128T is not running
 - \circ $\:$ IP3: node2 WAN IP when 128T is not running
 - VLANs not supported on WAN1
- If 128T is running, WAN1 and WAN2 will be used to connect to the 128T Conductor using equal cost load balancing of each session. The node without





the active WAN link will leverage the fabric link towards the other node for 128T Conductor connectivity.

- Default service called "internet" is created which routes all traffic out WAN1 as primary and WAN2 as backup
- Using a "Conductor" address as a FQDN is not fully supported. Must use an IPv4 address for the Conductor.



Diagram

Procedure

The following procedure outlines the best configuration practices for installing and configuring a highly available branch or headend router running the 128T Session Smart Router software.

Installation

• Install the 128T software on both using the 128T certified OTP ISO as outlined here:





- <u>https://community.128technology.com/viewdocument/how-to-guide-d</u> <u>ownloading-isos?CommunityKey=b11feb44-9c9c-4d2a-bfa2-63e8826d0</u> <u>d0a&tab=librarydocuments</u>
- Note, this boots to console by default. If the hardware platform has a VGA port, please select that option.
- Post initial installation, the system will turn itself off automatically. Please manually power on system.
- Post first initialization, the system will turn itself off automatically. Please manually power on system.
- After the initial installation and initialization are completed, plug in a computer to any Ethernet based port on the system and verify the computer has an IP address provided via DHCP.

128T Configuration

• Fill out the following fields and input them into the following config router builder:

https://128tconfigbuilder.reidlab.com/templates/ha-router-red-wan-inband-4-2.html

Parameter	Value
Authority Name	128technology
1st Conductor Address (must be an IP address)	7.7.7.7
Router Name	seattle-site-01-4-2-ha-red-inband-templat e
Site Address	North Bend, WA
Site Coordinates	+47.447306-121.75806/
NTP Server1 (can be FQDN or IP Address)	0.north-america.pool.ntp.org
NTP Server2 (can be FQDN or IP Address)	1.north-america.pool.ntp.org

• Note: all fields below are required



Nodel Name (e.g. "nodel")	nodel
Node2 Name (e.g. "node2")	node2
WANI VLAN (0 if no VLAN)	0
Nodel WANI Device PCI Address (XXXX:XX:XX.X)	0000:07:00.0
Node2 WAN1 Device PCI Address (XXXX:XX:XX.X)	0000:07:00.0
WAN1 Shared MAC Address (e.g. "00:01:ff:af:06:00")	00:01:ff:af:06:00
WANI Topology ("hub", "spoke", or "mesh")	hub
WANI Vector Name (e.g. "choicel", "WANI")	choice1
WAN1 IP Address	192.168.1.5
WAN1 Node1 Management IP	192.168.1.6
WAN1 Node2 Management IP	192.168.1.7
WAN1 Prefix	24
WAN1 Gateway	192.168.1.1
WAN2 VLAN (0 if no VLAN)	0
Node1 WAN2 Device PCI Address (XXXX:XX:XX.X)	0000:0b:00.0
Node2 WAN2 Device PCI Address (XXXX:XX:XX.X)	0000:0b:00.0
WAN2 Shared MAC Address (e.g. "00:01:ff:af:06:00")	00:01:ff:af:16:00
WAN2 Topology ("hub", "spoke", or "mesh")	hub
WAN2 Vector Name (e.g. "choice2", "WAN2")	choice2



WAN2 IP Address	192.168.10.101
WAN2 Prefix	24
WAN2 Gateway	192.168.10.1
LAN VLAN (0 if no VLAN)	0
Nodel LAN Device PCI Address	0000:0b:00.1
Node2 LAN Device PCI Address	0000:0b:00.1
LAN Shared MAC Address (e.g. "00:01:ff:af:26:00")	00:01:ff:af:26:00
LAN IP Address	192.168.128.1
LAN Prefix	24
LAN Tenant	guest-wifi
Nodel Fabric Device PCI Address	0000:04:00.0
Node2 Fabric Device PCI Address	0000:04:00.0
Nodel Sync Device PCI Address	0000:08:00.0
Node2 Sync Device PCI Address	0000:08:00.0
Nodel Inband Mgmt/Loopback IP Address (assumes /30)	10.128.128.0
Node2 Inband Mgmt/Loopback Gateway (assumes /30)	10.128.128.1
Management DNS Server IP1	8.8.8.8
Management DNS Server IP2	1.1.1.1

• On Nodel, determine which Linux interface name is WAN1. Using the "Nodel WAN1 Device PCI Address" above issue this command:

t128@<hostname> ~]\$ dmesg | grep <insert-WAN1-PCI-address> | grep Network -A1 [1522.373299] igb <insert-WAN1-PCI-address>: Intel(R) Gigabit





Ethernet Network Connection [1522.382612] igb <insert-wan1-pci-address>: enp0s20f0: PBA No: 001800-000</insert-wan1-pci-address>			
 In this example the WAN1 Li 	nux interface name is "enp0s20f0"		
WANI Nodel Linux Interface Name	enp0s20f0		

• On Node2, determine which Linux interface name is WAN1. Using the "Node2 WAN1 Device PCI Address" above issue this command:



• In this example the WAN1 Linux interface name is "enp0s20f0"

WAN1 Node2 Linux Interface Name	enp0s20f0
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• Open the PCLI on the 128T Conductor by accessing "Conductor" -> "Open Remote Terminal"

128 technology conductor-field-	eng	📀 Node: node1			ወ 🖬 🔹 :			
Explore Configure	ation	Location		Role	Open Remote Terminal mbo	ē	Debug	>
ф ⁶ 2	(j)	Up Time	2d 18h 33m 42s	Software Version	4.2.0 (Hover for more details)	÷	Event History	>
DASHBOARD		128T Processes	All Processes Running (Hover for more details)	Asset Status	RUNNING (Hover for more details)	8	Logs	>

- Copy the config from the config builder tool and paste it into the managed 128T
- Run "validate" and "commit" the put the config into Running.
- For each of these follow steps, complete the QuickStart process for node1 and then repeat all for node2:
 - Go to the 128T Conductor UI to start the QuickStart process for this newly created 128T Router by accessing "Routers" -> "<Router Name>"
 -> "QUICKSTART LINK"







Router Name	Node Name
seattle-site-02-4-2-branch-templa	nodel
Asset Identification	
Device Hest Address	
Jevice Host Address	
	6
Follow the instructions below to co QuickStart file:	onfigure a 128T node using the
Follow the instructions below to co QuickStart file: 1. Click here to download the QuickS 2. On a computer connected to the t navigate to: https://192.168.0.128/qu	onfigure a 128T node using the start file. arget 128T node, open a browser and ick-start
 Follow the instructions below to co QuickStart file: 1. Click here to download the QuickS 2. On a computer connected to the to navigate to: https://192.168.0.128/qui 3. Drag and drop the QuickStart file instructions on the screen to comp 	onfigure a 128T node using the itart file. arget 128T node, open a browser and ick-start into the page and follow the plete the QuickStart process.

- Copy the "Password" auto generated
- Follow step1 to download the QuickStart file locally by selecting the "Click Here" link





- Plug in a computer to any ethernet port on the new router system and ensure DHCP is enabled on the local computer
- Follow step2 and click the link to start the QuickStart URL process
- Login locally to the new router with the default username "admin" and password "128Tadmin"
- Drag and drop the QuickStart file and click "Proceed"

← → C ☆ ▲ Not Secure	192.168.0.128/quick-start	☆	:
	128 QuickStart		
	Drag and Drop a QuickStart file to begin.		
	Or UPLOAD A FILE		

 Paste the "Password" previously copied to unencrypt the QuickStart file and click "Continue"

← → C ☆ ▲ Not Secure	192.168.0.128/quick-start	x 😨 :
	128 QuickStart	
	Password Required This QuickStart file is password protected. Please enter the password used when this QuickStart distributable was created.	
	QuickStart Password XXXX-XXXX-XXXX	
	CANCEL CONTINUE	

- Click "Proceed" to start this process
 - Optionally, select the "Show Details" slider to view the full config that will be configured





\leftrightarrow \Rightarrow \bigcirc \uparrow \land Not Secure 192.168.0.128/quick-start		☆ 👧 i
Velcome You are about to com This operation will reg configuration that will This router will assum	Let this device to a 128T Conductor. Jace the current candidate and running configuration with a I provide connectivity to the designated 128T conductor. e the attributes found below:	
Authority Router Name Node Name Asset Identification Conductor Address	Authority128 Show Details test-bcp-standalone-oob-mgmt nodel 1464/231-12/6-4d0f-b06f-f2/af0a03e68 54.84.140.148	
	CANCEL PROCEED	

 After around 10 mins, this process will complete and your 128T Router will be fully configured.

← → C △ ▲ Not Secure 192.168.0.1/quic	k-start	\$ •	۰ گ
	128 QuickStart		
	This router is now being configured		

 After around 20 mins, the router QuickStart webpage will show a message that the router was successfully configured.



Verifying Operation





Go to the 128T Conductor UI to verify the process completed for this newly created Node on the 128T Router by accessing "Routers" -> "<Router Name>" -> "<Node Name>"

- Verify "128T Processes" -> "All Processes Running"
- Verify "Asset Status" -> "RUNNING"
 - Verify all 4 interfaces are "Up"

128 128technology conductor-heid-eng	📀 Node: node1					0 5.	¢ :		
Explore Configuration	Location		- Role				Combo	Debug	>
µ ⁹ ≗ 0	Up Time	Ilr	n 24s Softw	are Version		OHove	4.2.0 r for more details)	Event Histor	y ,
DASHBOARD	128T Processes	All Processes Run Hover for more	ining details) Asset	Status		(Hove	RUNNING r for more details)	🗄 Logs	>
CUSTOM REPORTS	Bandwidth	Δ	C	0.004628 Mbps	Session Count		m	L	23 Sessions
Routers Services Tenants	Session Arrivals	MM		1 Sessions/s	Session Departu	ires	M	4	1 Sessions/s
V TROUBLESHOOT	Health								
Ping Routing Tables	General CPU Averaged over 3 cores								4% v
 ADMINISTRATION Configuration 	Packet Processing CPU Averaged over 1 core								0% ~
Event History Plugins	Memory Consumed by all processes								3.9/8.4 GB ~
Users Entitlements	Disk Averaged over 1 partition								3.8/125.2 GB ~
	Network Capacity Utilization								
	FIB Entires	9%	Flows			0%	ARP Entires		0%
	Action Pool	1%	Source Tenants			0%	Access Policies		17%
	Device Interfaces								
	Device Interface	Туре	Link	Redundancy	Forwarding	PCI Address	MAC Address	Shared MAC	Avg. B/W (Mbps)
	🖉 LAN	ethernet	auto	Non Redu	Yes	0000:00:14.2	00:90:0b:66:be:5	18	0
	🖉 WANI	ethernet	auto	Non Redu	Yes	0000:00:14.0	00:90:0b:66:be:5	16	0.53
	S WAN2	ethernet	auto	Non Redu	Yes	0000:00:14.1	00:90:0b:66:be:5	17	0
	loopback	host	auto	Non Redu	Yes		8e:0c:eb:c5:7c:e-	4	0.51

• Repeat these verification steps for Node2.

128T Post Software Setup

 Post installation and 128T setup, use the Conductor UI to login to the console of the configured Nodel 128T Router to start by navigating to "Routers" -> "<Router-Name>" -> "<Node-Name>" -> "Open Remote Terminal"

128 128 con	technology ductor-field	r d-eng	🤣 Node: node1		U 🗈 🌣 :				
Ø Explo	re Configi	uration	Location		Role	Open Remote Terminal mbo	õ	Debug	>
Ļ ⁶	Do	(j)	Up Time	2d 18h 33m 42s	Software Version	4.2.0 (Hover for more details)	÷	Event History	>
DASHBOAR	RD		128T Processes	All Processes Running (Hover for more details)	Asset Status	RUNNING (Hover for more details)	8	Logs	>

• Enter user "t128" and click "LOGIN" button



•	0	128T - PCLI - seattle-site-02-4-2-branch-template - node1	
6	field-conductor.128technol	ogy.com/pcli?router=seattle-site-02-4-2-branch-template&node=node1 G	
		Enter or Select a User	
		+139	
		amorris(Current User)	
		-	

- Enter default ISO password "128tRoutes"
- Steps to manually configure Nodel WANI in Linux to connect to the 128T Conductor when 128T is not running.
 - Using the following inputs from the template above and and input them into the following interface builder tool:

WAN1 Node1 Linux Interface Name	enp0s20f0
WAN1 Node1 Management IP	192.168.1.6
WAN1 Prefix	24
WANI Gateway	192.168.1.1
Management DNS Server IP1	8.8.8.8
Management DNS Server IP2	8.8.4.4

- <u>https://128tconfigbuilder.reidlab.com/templates/4-2-linux-i</u> <u>nterface.html</u>
- Create the Nodel Linux WANI interface:

t128@<hostname> ~]\$ sudo bash -c "cat >
/etc/sysconfig/network-scripts/ifcfg-<Linux-int-name> << EOF</pre>

- Paste the contents from the interface builder tool into the remote router terminal
- > <paste line1>
 > <paste line2>

```
> \paste iii
```

> ...



> <paste lineX>

• Use "EOF" to finish creating the Linux interface configuration file followed by the default "t128" password "128tRoutes"

> EOF"	
[sudo] password for t128:	

 Use the Conductor UI to login to the console of the configured Node2 128T Router to start by navigating to "Routers" -> "<Router-Name>" -> "<Node-Name>" -> "Open Remote Terminal"

128 L28 CON	itechnology iductor-field	1-eng	Node: node1			ሀ 🖂 🏟 :			
Explore Configuration Loc			Location		Role	Open Remote Terminal mbo	Ō	Debug	>
Ļ ⁶	ß	()	Up Time	2d 18h 33m 42s	Software Version	4.2.0 (Hover for more details)	÷	Event History	>
DASHBOAR	RD		128T Processes	 All Processes Running (Hover for more details) 	Asset Status	RUNNING (Hover for more details)	8	Logs	>

Enter user "t128" and click "LOGIN" button



- Enter default ISO password "128tRoutes"
- Steps to manually configure Node2 WAN1 in Linux to connect to the 128T Conductor when 128T is not running.
 - Using the following inputs from the template above and and input them into the following interface builder tool:

	WAN1 Node2 Linux Interface Name							е	enp0s20f0											
2	28 —		-	0.11	<u> </u>	()				6			C		~				7.4	

WAN1 Node2 Management IP	192.168.1.7
WANI Prefix	24
WANI Gateway	192.168.1.1
Management DNS Server IP1	8.8.8.8
Management DNS Server IP2	8.8.4.4

- <u>https://128tconfigbuilder.reidlab.com/templates/4-2-linux-i</u> <u>nterface.html</u>
- Create the Node2 Linux WAN1 interface:

t128@<hostname> ~]\$ sudo bash -c "cat >
/etc/sysconfig/network-scripts/ifcfg-<Linux-int-name> << EOF</pre>

- Paste the contents from the interface builder tool into the remote router terminal
- > <paste line1>
- > <paste line2>
- > ...
- > <paste lineX>
 - Use "EOF" to finish creating the Linux interface configuration file followed by the default "t128" password "128tRoutes"

> EOF"
[sudo] password for t128:

• Steps to change default passwords for all 128T created Linux users ("t128" and "root"):

```
t128@<hostname> ~]$ passwd
Changing password for user t128.
Changing password for t128.
(current) UNIX password:
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
t128@<hostname> ~]$ sudo passwd
Changing password for user root.
```





New password: Retype new password: passwd: all authentication tokens updated successfully.

Further Resources

Additional technical resources can be found on the 128 Technology customer community - Interchange: <u>https://community.128technology.com/</u>.

Known Issues

195-31279 - Salt timeout issues occasionally occur post QuickStart URL install. The work around is a manual restart of the 128T software.

195-31985 - NTP client takes a long time to attempt to connect post 4.2.0 OTP install. A NTP alarm may be present until NTP can connect to sync system time.

