Catalyst SD-WAN AppQoE DRE -拓撲、配置、 驗證

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簡介

本文說明如何建立及設定資料備援消除(DRE)最佳化的設定。

背景資訊

本文檔旨在作為如何建立和配置DRE設定的指導的起點,DRE是<u>整合應用體驗品質(AppQoE)解決</u> <u>方案</u>的一部分,為多個部署使用案例提供端到端一致的策略架構和監控。

AppQoE解決方案的構建塊:

- 轉發糾錯(FEC)和資料包複製(PD):解決資料包丟失問題。請參閱FEC。
- TCP最佳化:解決WAN延遲問題。有關單側TCP可選用例,請參閱。

• DRE最佳化:解決低頻寬問題。通常,DRE最佳化與TCP最佳化一起使用。

現有CCO DRE文檔不包含完整的端到端流程說明。本檔案提供DRE解決方案端對端的分步說明。

對DRE功能進行深入的技術說明不在本文的討論範圍之內。如果您想進一步瞭解技術細節和DRE功 能,請使用<u>此檔案。</u>

DRE最佳化

DRE是一種雙面解決方案,透過快取先前看到的模式來刪除冗餘資料。DRE功能結合Lempel-Ziv-Welch (LZW)演算法(提供壓縮功能以減少廣域網上的資料量),可提供具有統一威脅防禦(UTD)和 安全套接字層(SSL)代理的完全安全和整合的解決方案。

它與應用和協定無關,是一種雲就緒解決方案,可降低約60-90%的WAN流量。

支援不同的部署方案以實現可擴展的解決方案。

- 該整合解決方案為部署分支機構服務提供了一個一體化解決方案,稱為整合服務節點(ISN)。
- 外部服務節點(ESN)與外部服務節點部署中的攔截邊緣路由器或服務控制器(SC)分離,通常在 資料中心和集線器。使用資料策略實現基於應用流量的流重定向。

控制連線



註:ESN不會與控制器(以前稱為vSmart)形成任何控制連線。ESN具有到SD-WAN Manager的控制連線。



DC/Hub - SC

使用ISN和ESN構建AppQoE DRE設定的步驟

- 1. 系統(介面和硬體)和拓撲
- 1.1.拓撲和介面

ESN需要以下介面:

- VPN0介面連線到控制器(Manager和Validator [transient])。 從ESN到控制器的連線可以直接或透過SC。建議透過SC進行,因為這樣可避免在ESN上需要 額外的WAN電路。
- 用於連線到服務控制器的另一個VPN0介面。
- 可選: VPN512管理介面。



1.2.磁碟要求

對於實驗設定,150GB磁碟足夠好,DRE最佳化可以正常工作。

這僅適用於實驗室環境中的功能驗證,不適用於生產。有關準確的磁碟和其他建議,請檢視<u>此</u> <u>CCO連結</u>。



注意:此附加磁碟要求僅適用於ISN和ESN。SC上不需要此功能。

1.3.向SD-WAN交換矩陣增加裝置

- 使用範本(自20.6/17.6以後提供):可在裝置範本中指定為額外範本的AppQoe功能範本。
- 使用配置組(自20.14/17.14以後提供):配置組中的服務/LAN配置檔案中提供的AppQoE功 能包。

1.4. C8000v詳細資料

如果您使用的是c8kv,請確保啟用應用密集型CPU配置檔案配置。<u>實用文章</u>。

2. 分支: AppQoE ISN配置

為裝置模型建立AppQoE功能模板(使用此處所示的模板)。

Configuration			
Device Templates Feat	ure Templates		
Feature Template > AppQoE 3	DRE-IntNode-template		
Device Type	C8000v		
Template Name	DRE-IntNode-template		
Description	Feature Template for Integrated Node		
Control Components	Service Node		
Control Components			
Integrated Service Nod	e 🖉 Enable	1	
Controller IP address	(\oplus)	192.168.2.1	
Service Node IP 1		192.168.2.2	
Advanced			
DRE Optimization () Resource Profile		default	
SSL Decryption ()	Enable		

然後,在裝置模板中指定此功能模板。

Additional Templates	
AppQoE	DRE-IntNode-template 🗸
2 50/集伯昭, 4,550도 501회목	

3. DC/集線器: AppQoE ESN配置

為裝置型號建立AppQoE Feature Template。

Configuration	
Device Templates Fe	ature Templates
Feature Template > AppQoB	DRE-feature-template
Device Type	C8000v
Template Name	DRE-feature-template
Description	Feature Template for DRE
Control Components	Service Node
Service Node	
External Service Node	Enable
Advanced	
DRE Optimization Resource Profile	J Contraction of the second s
SSL Decryption	Enable

然後,在裝置模板中指定此功能模板。

Additional Te	mplates		
AppQoE *			DRE-feature-template
4. DC/集線器: AppQoE SC配	置		
高裝直模型建立AppQoE切能 Configuration	侯似。 Ire Templates		
Feature Template > AppQoE >	DRE-DC2-ServContr-Template		
Device Type	C8000v		
Template Name	DRE-DC2-ServContr-Template		
Description	DRE AppQoE Template for DRE Service	Controller	
Control Components	Service Node		
Control Components			
Integrated Service Node	Enab	le	
Controller IP address	•	10.115.1.5	
Service VPN		115	
Service Nodes			
Service Node Group Nam	e		Service Node IP Addresses
SNG-APPQOE			1 Service Node IP Addresses

Additional Templates

DRE-DC2-ServContr-...

5. 集中式流量資料策略

AppQoE

- 需要兩個不同的策略:一個用於內部服務節點(ISN),另一個用於服務控制器(SC)。請參閱下面的差異。
- 兩者的策略方向必須為「全部」
- 對於ISN,服務節點組必須為空,並且為SC指定。
- DRE最佳化通常與TCP最佳化一起使用。

在本例中,在分支位置上定義了Web客戶端,在DC站點上定義了Web伺服器,您可能要相應地針對您感興趣的流量對其進行調整。

A.分支ISN

UI -範本

順序1-從使用者端10.107.1.10到伺服器10.109.1.10:

Custom Drag and drop to re-arrange rules Match Action	ons	
Protocol IPv4 → O Accept O Drop ◀ VPN Next Hop Policer Redirect DNS	Service	Service Chain AppQoE Optimization Loss Correction TLOC
Source Data Prefix List	×	Accept Enabled
Source: IP Prefix 10.107.1.10/32		AppQoE Optimization
Destination Data Prefix List Select a data prefix list	×	Service Node Group Example: SNG-APPQOE<1-31>
Destination: IP Prefix 0.109.1.10/32		

Custom Custom Drag and drop to re-arrange rules Match Protocol IPv4 Protocol Source Data Prefix Source Port Destin	Actions Ination Data Prefix Destination Region Destination Port TCP Traffic To
Match Conditions Source Data Prefix List Select a data prefix list Source: IP Prefix 10.109.110/32	Actions Accept Enabled AppQoE Optimization TCP Optimization DRE Optimization
Destination Data Prefix List Select a data prefix list Destination: IP Prefix 10.107.1.10/32	Service Node Group Example: SNG-APPQOE<1-31> Cancel Save Match and Actions

CLI:

ISN# show sdwan policy from-vsmart

from-vsmart data-policy _CorpVPN_DRE-data-policy-ISN-2 direction all vpn-list CorpVPN sequence 1 match source-ip 10.107.1.10/32 destination-ip 10.109.1.10/32 action accept tcp-optimization dre-optimization sequence 11 match source-ip 10.109.1.10/32 destination-ip 10.107.1.10/32 action accept tcp-optimization dre-optimization default-action accept

from-vsmart lists vpn-list CorpVPN vpn 1

B.資料中心/中心SC

UI -範本

序列1:

Match Actions Match Conditions Select a data prefix list Source: IP Prefix 10:1091.10/32 Destination: IP Prefix 10:1071.10/32 Match Actions Actions Actions Accept Enabled Accept Accept Actions Accept Actions Accept Actions Accept Actions Actions <	Custom Sequence Rule Drag and drop to re-arrange rules			Data
Match Conditions Actions Source Data Prefix List X Select a data prefix list Accept Enabled Source: IP Prefix 10.109.110/32 X X Destination Data Prefix List X Image: Comparison of the prefix List X Select a data prefix List X Image: Comparison of the prefix List X Select a data prefix List X Image: Comparison of the prefix List X Select a data prefix List X Image: Comparison of the prefix List X Destination: IP Prefix Image: Comparison of the prefix List X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X	Match Action Protocol IPv4 ▼ O Accept O Drop ✓ VPN Next Hop Policer Redirect DNS	s Service	vice Service Chain AppQoE Optimization Loss Correction TLOC	
	Match Conditions Source Data Prefix List Select a data prefix list Destination Data Prefix List Select a data prefix List Destination: IP Prefix 10.107.110/32 10.107.110/32	×	Actions Accept Enabled AppQoE Optimization × TCP Optimization × DRE Optimization Service Node Group Service Node Group SNG-APPQOE	

序列2:

Sequence Rule Drag and drop to re-arrange rules				
Protocol IPv4 Protocol Source Data Prefix Source Port De	Actions stination Data Prefix	Destination Region	Destination Port TCP Traft	fic To
Match Conditions		Actions		
Source Data Prefix List	×	Accept	Enabled	
Select a data prefix list Source: IP Prefix 10.107.1.10/32		AppQoE Optimization	ion	×
Destination Data Prefix List Select a data prefix list	×	Service Node Group	SNG-APPQOE	
Destination: IP Prefix				
10.109.1.10/32				
			Cancel	I Save Match and Action

CLI :

SC# show sdwan policy from-vsmart

from-vsmart data-policy _CorpVPN_DRE-data-policy-SC_ESN-2
direction all
vpn-list CorpVPN
sequence 1
match
source-ip 10.107.1.10/32
destination-ip 10.109.1.10/32
action accept
tcp-optimization
dre-optimization

service-node-group SNG-APPQOE sequence 11 match source-ip 10.109.1.10/32 destination-ip 10.107.1.10/32 action accept tcp-optimization dre-optimization service-node-group SNG-APPQOE default-action accept

from-vsmart lists vpn-list CorpVPN vpn 1

驗證- CLI

分支ISN

ISN# show sdwan appqoe dreopt status

DRE ID : 52:54:dd:2a:74:d7-018eafaa99e1-f9ff51aa DRE uptime : 04:10:59:59 Health status : GREEN Health status change reason : None Las ISN# show sdwan appqoe flow active T:TCP, S:SSL, U:UTD, D:DRE Flow ID VPN ID Source IP Port Destination IP Port Tx Bytes Rx Bytes ISN# show sdwan appqoe dreopt statistics Total connections : 4 Max concurrent connections : 1 Current active connections : 1 Total connection

資料中心/集線器SC

SC# show service-insertion type appqoe service-node-group Service Node Group name : SNG-APPQOE Service Context : appqoe/1 Member S

DC/集線器ESN

ESN# show sdwan appqoe dreopt status DRE ID : 52:54:dd:c3:40:17-018eb15f4fc3-49ee2d0f DRE uptime : 04:11:28:50 Health status : GREEN Health status

ESN# show sdwan appqoe dreopt statistics Total connections : 4 Max concurrent connections : 1 Current active connections : 1 Total connection resets : 0

驗證-儀表板

要在SD-WAN Manager裝置控制台中檢視AppQoE DRE資料,請確保以下內容:

• 透過配置網路時間協定(NTP)同步控制器和裝置時間。您還可以使用Clock set命令來手動設定時鐘。

• 將以下CLI增加到裝置配置(ISN/SC/ESN):

policy ip visibility features multi-sn enable
policy ip visibility features dre enable
policy ip visibility features sslproxy enable - (for SSL traffic)



註:應啟用按需故障排除以檢視這些控制台。請注意,此處顯示的儀表板螢幕不顯示即時資訊。

要獲取最新資料,您可能要導航到Tools > On Demand Troubleshooting,選擇適當的裝置和「DPI」作為資料型別,然後檢索過去3小時的DPI統計資訊,如下所示:

[2] 중 🗙 야 .	Monitor Configuration Tools Maintenance	BR7-DRE-IntNode-70.7.7.1-vedge V Data Backfill Time Period O Last 1 hour O Last 3 hours O Con Start Date Start time E (mm/dd/yyyy) E Th.mm AM V	ct Data Type ^	End time	<u>×</u>					
40	Administration								Save	Clear
-0	Workflows									
	Reports	Q Search Table								7
dil.	Analytics							As of: Apr 18	3, 2024 05:48 PM	63 N
Ø	Explore	ID	Device ID	Data Type	Creation Time	Expiration Time	Data Backfill Start Time	Data Backfill End Time	Status	Action
		1d7c7605-0e17-43d3-97e8-59c69ec6ac12	1.1.1.222	ConnectionEvents	Feb 15, 2022, 12:36:05 AM	Feb 15, 2022, 3:36:05 AM	Feb 14, 2022, 11:36:05 PM	Feb 15, 2022, 12:36:05 AM	COMPLETED	
		a92e3d95-9ac9-4a87-a36d-311012d9c0f9	70.7.7.1	DPI	Apr 18, 2024, 5:44:33 PM	Apr 18, 2024, 8:44:33 PM	Apr 18, 2024, 2:44:33 PM	Apr 18, 2024, 5:44:33 PM	COMPLETED	
		2 Records					Item	s per page: 25 👻 1 - 2 of 2	IK K	> >

分支ISN

已下載的資料約為900MB (3 x 200MB檔案和3 x 100MB檔案) - 原始流量(黃色)。

最佳化結果僅透過WAN傳送了8.07MB的流量,將頻寬使用量減少了90%左右-最佳化流量(藍色)。

Devices > AppQoE Integrated	d Service Node
Select Device 💙	BR7-DRE-IntNode 70.7.7.1 Site Name 70 Device Model: C8000v 🕕
APPLICATIONS	Data Backfill Start Time: Wed Apr 17 2024 13:54:41 GMT-0400 and Data Backfill End Time: Wed Apr 17 2024 16:54:41 GMT-0400
SAIE Applications	Chart Options 🗸
Interface	Optimized Traffic Application
Tracker	111 <mark>311</mark> 811 1211 2411 7days C
QoS	Controller Service Node
ON-DEMAND TROUBLESHOOTING	Export
FEC Recovery Rate	Optimized Traffic Original Traffic
SSL Proxy	715.26 MB
AppQoE TCP Optimization	Apr 17, 16:35:00
AppQoE DRE Optimization	Original Traffic: 939.36 MB
Connection Events	
WAN Throughput	
Flows	238.42 MB
Top Talkers	
WAN	0 B Ager 17, 14:00 Ager 17, 14:15 Ager 17, 14:30 Ager 17, 14:45 Ager 17, 15:00 Ager 17, 15:15 Ager 17, 15:30 Ager 17, 15:45 Ager 17, 16:00 Ager 17, 16:15 Ager 17, 16:30 Ager 17, 16:45
TLOC	
Tunnel	Q Search
Managed Cellular Activation - eSIM	
SECURITY MONITORING	1 Rows Selected Total Rows: 1 🚺 🚳
Firewall	Service Node IP System IP Site Id Status TCP Status/Load DRE Status/Load SSL Proxy Status/Load Error
Intrusion Prevention	
URL Filtering	

資料中心/集線器SC

如果有多個ESN,則Controller頁籤顯示累計資料,而Service Node頁籤顯示單個ESN資料。

Devices > AppQoE Service Co	ntroller	
Select Device 💙	BR9-DRE-ServContr 90.1.90.1 Site Name SITE_90 Device Model: C80000 ①	
APPLICATIONS	Data Backfill Start Time: Wed Apr 17 2024 13:55:37 GMT-0400 and Data Backfill End Time: Wed Apr 17 2024 16:55:37 GMT-0400	
SAIE Applications	Chart Options 🗸	
Interface	Optimized Traffic Application	
Tracker		1h 3h 6h 12h 24h 7days Custom
QoS	Controller Service Node	
ON-DEMAND	Expert	Legend
EEC Baseway Data		 Optimized Traffic
SSL Proxy	476.84 M8	 Original Traffic
AppQoE TCP Optimization	Apr 17, 16:35:00 © Optimil Traffic: 4:54 MB © Optimil Traffic: 531:52 MB	
AppQoE DRE Optimization	Ť	
Connection Events	2 286.1 MD	
WAN Throughput	190.73 MB	
Flows	46.33.18	
Top Talkers	70. J/ MD	
WAN	0 B Apr 17, 14:00 Apr 17, 14:15 Apr 17, 14:30 Apr 17, 14:45 Apr 17, 15:00 Apr 17, 15:15 Apr 17, 15:30 Apr 17, 15:45 Apr 17, 16:00 Apr 17, 16:15 Apr 17, 16:45 Apr	17
TLOC		
Tunnel	Q Search	V
Managed Cellular Activation - eSIM	1 Rouse Coloniand	
SECURITY MONITORING	I KOMP PAIECIAO	Total Rows: 1 🛟 🔅
Firewall	Service Node IP System IP Site Id Status TCP Status/Load DRF Status/Load SSL Provy Status/Lo	ad Error
Intrusion Prevention		
URL Filtering		-

DC/集線器ESN

Devices > AppQoE Service N	ode				
Select Device 👻	BR9-DRE-ExtNode 90.1.90.2 Site Name	Device Model: C8000v (i)			
APPLICATIONS SAIE Applications	Data Backfill Start Time: Wed Apr 1 Chart Options 🗸	7 2024 13:55:31 GMT-0400 and Data B	ackfill End Time: Wed Apr 17 202	4 16:55:31 GMT-0400	
Interface		0	timized Traffic Application		
Tracker					1h 3h 6h 12h 24h 7days Custo
QoS			Service Node Control	ller	
ON-DEMAND TROUBLESHOOTING	Export				Legend
FEC Recovery Rate	476.84 M8			N	Optimized Traffic Original Traffic
SSL Proxy AppQoE TCP Optimization	381.47 M8			Apr 17, 16:40:00 Optimized Traffic: 3.52 MB	
AppQoE DRE Optimization	286.1 MB			Original Trame: 425.86 MB	
Connection Events	á				
WAN Throughput	190.73 MB				
Flows	95.37 M8				
Top Talkers					
WAN	Apr 17, 14:00 Apr 17, 14:15	Apr 17, 14:30 Apr 17, 14:45 Apr 17, 15:00 Apr 1	7, 15:15 Apr 17, 15:30 Apr 17, 15:45 Apr	r 17, 16:00 Apr 17, 16:15 Apr 17, 16:30	Apr 17, 16:45 Apr 17,
TLOC					
Tunnel	Q Search				V
Managed Cellular Activation - eSIM	1 Rows Selected				
SECURITY MONITORING					Total Rows: 1 🛟 🚳
Firewall	Service Controller IP	Service Controller System IP	Service Controller Site Id	Service Node IP	Error
Intrusion Prevention	10.115.1.5	90.1.90.1	90	10.115.1.10	
URL Filtering					

關於此翻譯

思科已使用電腦和人工技術翻譯本文件,讓全世界的使用者能夠以自己的語言理解支援內容。請注 意,即使是最佳機器翻譯,也不如專業譯者翻譯的內容準確。Cisco Systems, Inc. 對這些翻譯的準 確度概不負責,並建議一律查看原始英文文件(提供連結)。