XX校园网业务测试报告

2019年9月

# 文 档 概 述

本规范适用范围为XX校园网网络设备及业务测试，测试内容包括网络设备安装、加电、设备所涉及业务的测试。

本规范所引用标准及具体技术要求见各测试项。

## 设备测试原则

完成基本单点验收测试，作为XX校园网测试依据，指导大家完成单站测试及业务测试。

要求完成设备硬件的全面测试；系统维护功能测试；完成基础配置协议的功能测试。

## 测试条件

设备单点验收测试前需要完成以下工作：

* 设备硬件安装工作；
* 设备加电工作，完成初始化配置；
* 设备到ODF端链路布放；
* 设备和链路标签制作；
* 设备物理连接及协议部署完成。

# 测 试 内 容

## **T01 设备安装工艺检查**

设备安装工艺检查包括确认设备上架安装、中继线布放等安装工艺是否符合设计，是否规范。

### T01-01 设备上架检查

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| 验收目的 | 确认设备上架工艺是否规范，上架后设备是否稳定、无损。 |
| 预置条件 | 设备安装上架，涉及R1—R3, SW1—SW6。 |
| 测试过程 | 1、检查设备机架按照位置是否符合设计； 2、检查设备硬件外观是否无损；  3、检查设备按照是否稳定牢固。 |
| 预期结果 | 设备安装符合设计，硬件外观无损，设备与机架连接稳固。 |
| 测试结果 | 通过 □ 未通过 □ 不涉及 ☑ |
| 测试说明 |  |

### T01-02 设备线缆检查

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| 验收目的 | 检查布放中继线是否符合设计、标记清晰规范；检查设备是否接地。 |
| 预置条件 | 各线缆布放完毕，涉及R1—R3, SW1—SW6。 |
| 测试过程 | 1、检查各线缆布放是否符合设计要求； 2、检查各线缆是否标记明晰；  3、检查各线缆是否捆扎整齐；  4、检查设备电源是否接入地线。 |
| 预期结果 | 各线缆布放符合设计、捆扎整齐、标记清晰、设备电源已接地线。 |
| 测试结果 | 通过 □ 未通过 □ 不涉及 ☑ |
| 测试说明 |  |

**T02 基础测试**

设备基础测试包括检查设备各板卡状态、各端口状态、设备状态灯是否正常等。

T02-01 加电测试

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| 验收目的 | 检查指示灯状态 |
| 预置条件 | 电源、单板及机箱安装正确，涉及R1—R3, SW1—SW6。 |
| 测试过程 | 1、确认插座连接无误，打开电源开关，观察路由器的启动时的状态；  2、观察电源的指示灯，检查电源供电是否正常；  3、观察风扇框的指示灯，检查风扇运转是否正常；  4、观察MPU板的指示灯，检查MPU板是否正常；  5、观察BSU板的指示灯，检查BSU板是否正常；  6、观察SFU板的指示灯，检查LPU板是否正常。 |
| 预期结果 | 1、电源的指示灯IN、OUT常亮；  2、风扇框的指示灯正常显示，绿灯慢闪（0.5次/秒）；  3、MPU板的指示灯正常显示，RUN灯慢闪（0.5次/秒）；  4、BSU板的指示灯正常显示，RUN灯慢闪（0.5次/秒）；  5、SFU板的指示灯正常显示，RUN灯慢闪（0.5次/秒）。 |
| 测试结果 | 通过 □ 未通过 □ 不涉及 ☑ |
| 测试说明 |  |

T02-02 软件版本检查

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| 验收目的 | 检查软件版本。 |
| 预置条件 | 设备加电并运行正常，涉及R1—R3, SW1—SW6。 |
| 测试过程 | 使用show version检查软件版本。 |
| 预期结果 | **R1>sh version**  Cisco IOS Software, 2800 Software (C2800NM-ADVIPSERVICESK9-M), Version 12.4(15)T1, RELEASE SOFTWARE (fc2)  Technical Support: http://www.cisco.com/techsupport  Copyright (c) 1986-2007 by Cisco Systems, Inc.  Compiled Wed 18-Jul-07 06:21 by pt\_rel\_team  ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)  Copyright (c) 2000 by cisco Systems, Inc.  System returned to ROM by power-on  System image file is "c2800nm-advipservicesk9-mz.124-15.T1.bin"  This product contains cryptographic features and is subject to United  States and local country laws governing import, export, transfer and  use. Delivery of Cisco cryptographic products does not imply  third-party authority to import, export, distribute or use encryption.  Importers, exporters, distributors and users are responsible for  compliance with U.S. and local country laws. By using this product you  agree to comply with applicable laws and regulations. If you are unable  to comply with U.S. and local laws, return this product immediately.  A summary of U.S. laws governing Cisco cryptographic products may be found at:  http://www.cisco.com/wwl/export/crypto/tool/stqrg.html  If you require further assistance please contact us by sending email to  export@cisco.com.  cisco 2811 (MPC860) processor (revision 0x200) with 60416K/5120K bytes of memory  Processor board ID JAD05190MTZ (4292891495)  M860 processor: part number 0, mask 49  3 FastEthernet/IEEE 802.3 interface(s)  1 Low-speed serial(sync/async) network interface(s)  239K bytes of NVRAM.  62720K bytes of processor board System flash (Read/Write)  Configuration register is 0x2102  **SW1>show version**  Cisco IOS Software, C3560 Software (C3560-ADVIPSERVICESK9-M), Version 12.2(37)SE1, RELEASE SOFTWARE (fc1)  Copyright (c) 1986-2007 by Cisco Systems, Inc.  Compiled Thu 05-Jul-07 22:22 by pt\_team  Image text-base: 0x00003000, data-base: 0x01500000  ROM: C3560 Boot Loader (C3560-HBOOT-M) Version 12.2(25r)SEC, RELEASE SOFTWARE (fc4)  System returned to ROM by power-on  This product contains cryptographic features and is subject to United  States and local country laws governing import, export, transfer and  use. Delivery of Cisco cryptographic products does not imply  third-party authority to import, export, distribute or use encryption.  Importers, exporters, distributors and users are responsible for  compliance with U.S. and local country laws. By using this product you  agree to comply with applicable laws and regulations. If you are unable  to comply with U.S. and local laws, return this product immediately.  A summary of U.S. laws governing Cisco cryptographic products may be found at:  http://www.cisco.com/wwl/export/crypto/tool/stqrg.html  If you require further assistance please contact us by sending email to  export@cisco.com.  cisco WS-C3560-24PS (PowerPC405) processor (revision P0) with 122880K/8184K bytes of memory.  Processor board ID CAT1037RJF7  24 FastEthernet/IEEE 802.3 interface(s)  2 Gigabit Ethernet/IEEE 802.3 interface(s)  63488K bytes of flash-simulated non-volatile configuration memory.  Base ethernet MAC Address : 00D0.5841.0E1A  Motherboard assembly number : 73-9673-09  Power supply part number : 341-0029-05  Motherboard serial number : CAT103758VY  Power supply serial number : DTH1036C7UB  Model revision number : P0  Motherboard revision number : A0  Model number : WS-C3560-24PS-E  System serial number : CAT1037RJF7  Top Assembly Part Number : 800-26380-04  Top Assembly Revision Number : B0  Version ID : V06  CLEI Code Number : COM1100ARC  Hardware Board Revision Number : 0x01  Switch Ports Model SW Version SW Image  ------ ----- ----- ---------- ----------  \* 1 26 WS-C3560-24PS 12.2(37)SE1 C3560-ADVIPSERVICESK  Configuration register is 0xF  **SW3>sh version**  Cisco Internetwork Operating System Software  IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA4, RELEASE SOFTWARE(fc1)  Copyright (c) 1986-2005 by cisco Systems, Inc.  Compiled Wed 18-May-05 22:31 by jharirba  Image text-base: 0x80010000, data-base: 0x80562000  ROM: Bootstrap program is is C2950 boot loader  Switch uptime is 34 minutes, 8 seconds  System returned to ROM by power-on  Cisco WS-C2950-24 (RC32300) processor (revision C0) with 21039K bytes of memory.  Processor board ID FHK0610Z0WC  Last reset from system-reset  Running Standard Image  24 FastEthernet/IEEE 802.3 interface(s)  63488K bytes of flash-simulated non-volatile configuration memory.  Base ethernet MAC Address: 000A.415A.8981  Motherboard assembly number: 73-5781-09  Power supply part number: 34-0965-01  Motherboard serial number: FOC061004SZ  Power supply serial number: DAB0609127D  Model revision number: C0  Motherboard revision number: A0  Model number: WS-C2950-24  System serial number: FHK0610Z0WC  Configuration register is 0xF |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

## **T03 连通性测试**

## T03-01 链路质量测试

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| 验收目的 | 测试互联链路质量。 |
| 预置条件 | 设备加电运行正常，完成设备之间物理连接，配置IP地址，涉及R1—R3, SW1—SW6。 |
| 测试过程 | 在设备上ping和上联设备互联接口地址，ping包个数为100个，ping大包2000默认。 |
| 预期结果 | **R1#ping**  Protocol [ip]:  Target IP address: 100.0.0.1  Repeat count [5]: 100  Datagram size [100]: 2000  Timeout in seconds [2]:  Extended commands [n]:  Sweep range of sizes [n]:  Type escape sequence to abort.  Sending 100, 2000-byte ICMP Echos to 100.0.0.1, timeout is 2 seconds:  .!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  Success rate is 99 percent (99/100), round-trip min/avg/max = 0/2/26 ms  **R2#ping**  Protocol [ip]:  Target IP address: 200.0.0.1  Repeat count [5]: 100  Datagram size [100]: 2000  Timeout in seconds [2]:  Extended commands [n]:  Sweep range of sizes [n]:  Type escape sequence to abort.  Sending 100, 2000-byte ICMP Echos to 200.0.0.1, timeout is 2 seconds:  .!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  Success rate is 99 percent (99/100), round-trip min/avg/max = 0/1/4294967295 ms  **R3#ping**  Protocol [ip]:  Target IP address: 10.134.130.129  Repeat count [5]: 100  Datagram size [100]: 2000  Timeout in seconds [2]:  Extended commands [n]:  Sweep range of sizes [n]:  Type escape sequence to abort.  Sending 100, 2000-byte ICMP Echos to 10.134.130.129, timeout is 2 seconds:  !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  Success rate is 100 percent (100/100), round-trip min/avg/max = 18/24/37 ms  **SW1#ping**  Protocol [ip]:  Target IP address: 10.134.130.1  Repeat count [5]: 100  Datagram size [100]: 2000  Timeout in seconds [2]:  Extended commands [n]:  Sweep range of sizes [n]:  Type escape sequence to abort.  Sending 100, 2000-byte ICMP Echos to 10.134.130.1, timeout is 2 seconds:  !!!!!!!!!!!!!!!!!!!!!!!!!!!..!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!  Success rate is 97 percent (97/100), round-trip min/avg/max = 0/2/4294967295 ms  **SW2#ping**  Protocol [ip]:  Target IP address: 10.134.130.5  Repeat count [5]: 100  Datagram size [100]: 2000  Timeout in seconds [2]:  Extended commands [n]:  Sweep range of sizes [n]:  Type escape sequence to abort.  Sending 100, 2000-byte ICMP Echos to 10.134.130.5, timeout is 2 seconds:  !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!  Success rate is 99 percent (99/100), round-trip min/avg/max = 0/2/25 ms |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

## **T04 协议状态查询**

检查各节点设备协议状态。

### T04-01 OSPF协议邻居状态查询

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| 验收目的 | 检查本节点OSPF协议邻居状态。 |
| 预置条件 | 设备加电运行正常，完成各节点连接，OSPF协议收敛完成，涉及R1—R3, SW1—SW2。 |
| 测试过程 | 1、使用show ip ospf neighbor命令，查看本节点设备OSPF邻居信息； |
| 预期结果 | 本节点OSPF邻居关系与规划设计相一致，并邻居关系建立正常。实例如下：  **R1#sh ip ospf neighbor**  Neighbor ID Pri State Dead Time Address Interface  10.134.128.3 0 FULL/ - 00:00:30 10.134.130.130 Serial0/2/0  10.134.129.2 1 FULL/DR 00:00:34 10.134.130.6 FastEthernet1/0  10.134.128.1 1 EXSTART/BDR 00:00:33 10.134.130.5 FastEthernet1/0  10.134.129.1 1 FULL/DR 00:00:33 10.134.130.2 FastEthernet0/1  10.134.128.1 1 EXSTART/BDR 00:00:34 10.134.130.1 FastEthernet0/1  10.134.128.2 0 FULL/ - 00:00:34 10.134.130.134 Tunnel0  **R2#sh ip ospf neighbor**  Neighbor ID Pri State Dead Time Address Interface  10.134.128.1 0 FULL/ - 00:00:37 10.134.130.133 Tunnel0  **R3#sh ip ospf neighbor**  Neighbor ID Pri State Dead Time Address Interface  10.134.128.1 0 FULL/ - 00:00:36 10.134.130.129 Serial0/2/0  **SW1#sh ip ospf neighbor**  Neighbor ID Pri State Dead Time Address Interface  10.134.129.1 1 EXSTART/DR 00:00:34 10.134.130.2 Vlan11  10.134.128.1 1 FULL/BDR 00:00:34 10.134.130.1 Vlan11  10.134.129.2 1 FULL/DR 00:00:34 10.134.130.10 Vlan13  **SW2#sh ip ospf neighbor**  Neighbor ID Pri State Dead Time Address Interface  10.134.129.2 1 EXSTART/DR 00:00:35 10.134.130.6 Vlan12  10.134.128.1 1 FULL/BDR 00:00:35 10.134.130.5 Vlan12  10.134.129.1 1 FULL/BDR 00:00:35 10.134.130.9 Vlan13 |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

### T04-02 HSRP协议状态查询

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| 验收目的 | 检查本节点HSRP协议是否正常。 |
| 预置条件 | 设备加电运行正常， HSRP协议收敛完成，涉及SW1—SW2。 |
| 测试过程 | 1、使用show standby brief命令，查看HSRP状态是否正常。 |
| 预期结果 | 本节点HSRP状态正常，符合拓扑要求：  **SW1#show standby brief**  P indicates configured to preempt.  |  Interface Grp Pri P State Active Standby Virtual IP  Vl2 2 105 Active local 10.134.129.2 10.134.129.254  Vl1 101 105 P Active local 10.134.0.252 10.134.0.1  Vl1 103 100 P Active local unknown 10.134.2.1  **SW2#sh standby brief**  P indicates configured to preempt.  |  Interface Grp Pri P State Active Standby Virtual IP  Vl2 2 100 P Standby 10.134.129.1 local 10.134.129.254  Vl1 101 100 P Standby 10.134.0.251 local 10.134.0.1  Vl1 103 105 Standby unknown local 10.134.2.1 |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

### T04-03 Ether-channel协议状态查询

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| 验收目的 | 检查本节点Ether-channel协议是否正常。 |
| 预置条件 | 设备加电运行正常， Ether-channel协议收敛完成，涉及SW1—SW2。 |
| 测试过程 | 1、使用show etherchannel port-channel命令，查看Ether-channel状态是否正常。 |
| 预期结果 | 本节点HSRP状态正常，符合拓扑要求：  **SW1#show etherchannel port-channel**  Channel-group listing:  ----------------------  Group: 12  ----------  Port-channels in the group:  ---------------------------  Port-channel: Po12 (Primary Aggregator)  ------------  Age of the Port-channel = 00d:00h:08m:16s  Logical slot/port = 2/12 Number of ports = 2  GC = 0x00000000 HotStandBy port = null  Port state = Port-channel  Protocol = LACP  Port Security = Disabled  Ports in the Port-channel:  Index Load Port EC state No of bits  ------+------+------+------------------+-----------  0 00 Gig0/1 Active 0  0 00 Gig0/2 Active 0  Time since last port bundled: 00d:00h:08m:16s Gig0/2  **SW2#show etherchannel port-channel**  Channel-group listing:  ----------------------  Group: 12  ----------  Port-channels in the group:  ---------------------------  Port-channel: Po12 (Primary Aggregator)  ------------  Age of the Port-channel = 00d:00h:31m:51s  Logical slot/port = 2/12 Number of ports = 2  GC = 0x00000000 HotStandBy port = null  Port state = Port-channel  Protocol = LACP  Port Security = Disabled  Ports in the Port-channel:  Index Load Port EC state No of bits  ------+------+------+------------------+-----------  0 00 Gig0/1 Active 0  0 00 Gig0/2 Active 0  Time since last port bundled: 00d:00h:31m:50s Gig0/2 |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

T04-04 RSTP协议状态查询

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| 验收目的 | 检查本节点RSTP协议是否正常。 |
| 预置条件 | 设备加电运行正常， RSTP协议收敛完成，涉及SW1—SW6。 |
| 测试过程 | 1、使用show spanning-tree命令，查看RSTP状态是否正常。 |
| 预期结果 | 本节点RSTP状态正常，符合拓扑要求：  **SW1#show spanning-tree**  VLAN0001  Spanning tree enabled protocol rstp  Root ID Priority 32769  Address 0090.2B1B.B40B  Cost 3  Port 27(Port-channel 12)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)  Address 00D0.5841.0E1A  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Po12 Root FWD 3 128.27 Shr  VLAN0002  Spanning tree enabled protocol rstp  Root ID Priority 24578  Address 00D0.5841.0E1A  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 24578 (priority 24576 sys-id-ext 2)  Address 00D0.5841.0E1A  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/2 Desg FWD 19 128.2 P2p  Fa0/5 Desg FWD 19 128.5 P2p  Fa0/6 Desg FWD 19 128.6 P2p  Po12 Desg FWD 3 128.27 Shr  VLAN0011  Spanning tree enabled protocol rstp  Root ID Priority 24587  Address 00D0.5841.0E1A  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 24587 (priority 24576 sys-id-ext 11)  Address 00D0.5841.0E1A  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Desg FWD 19 128.1 P2p  Po12 Desg FWD 3 128.27 Shr  VLAN0013  Spanning tree enabled protocol rstp  Root ID Priority 24589  Address 00D0.5841.0E1A  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 24589 (priority 24576 sys-id-ext 13)  Address 00D0.5841.0E1A  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Po12 Desg FWD 3 128.27 Shr  VLAN0101  Spanning tree enabled protocol rstp  Root ID Priority 24677  Address 00D0.5841.0E1A  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 24677 (priority 24576 sys-id-ext 101)  Address 00D0.5841.0E1A  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/2 Desg FWD 19 128.2 P2p  Po12 Desg FWD 3 128.27 Shr  VLAN0102  Spanning tree enabled protocol rstp  Root ID Priority 24678  Address 00D0.5841.0E1A  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 24678 (priority 24576 sys-id-ext 102)  Address 00D0.5841.0E1A  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/5 Desg FWD 19 128.5 P2p  Po12 Desg FWD 3 128.27 Shr  VLAN0103  Spanning tree enabled protocol rstp  Root ID Priority 20583  Address 0090.2B1B.B40B  Cost 3  Port 27(Port-channel 12)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 28775 (priority 28672 sys-id-ext 103)  Address 00D0.5841.0E1A  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/6 Desg FWD 19 128.6 P2p  Po12 Root FWD 3 128.27 Shr  **SW2#show spanning-tree**  VLAN0001  Spanning tree enabled protocol rstp  Root ID Priority 32769  Address 0090.2B1B.B40B  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)  Address 0090.2B1B.B40B  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Po12 Desg FWD 3 128.27 Shr  VLAN0002  Spanning tree enabled protocol rstp  Root ID Priority 24578  Address 00D0.5841.0E1A  Cost 3  Port 27(Port-channel 12)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 28674 (priority 28672 sys-id-ext 2)  Address 0090.2B1B.B40B  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/2 Desg FWD 19 128.2 P2p  Fa0/5 Desg FWD 19 128.5 P2p  Fa0/6 Desg FWD 19 128.6 P2p  Po12 Root FWD 3 128.27 Shr  VLAN0012  Spanning tree enabled protocol rstp  Root ID Priority 24588  Address 0090.2B1B.B40B  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 24588 (priority 24576 sys-id-ext 12)  Address 0090.2B1B.B40B  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Desg FWD 19 128.1 P2p  Po12 Desg FWD 3 128.27 Shr  VLAN0013  Spanning tree enabled protocol rstp  Root ID Priority 24589  Address 00D0.5841.0E1A  Cost 3  Port 27(Port-channel 12)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 28685 (priority 28672 sys-id-ext 13)  Address 0090.2B1B.B40B  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Po12 Root FWD 3 128.27 Shr  VLAN0101  Spanning tree enabled protocol rstp  Root ID Priority 24677  Address 00D0.5841.0E1A  Cost 3  Port 27(Port-channel 12)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 28773 (priority 28672 sys-id-ext 101)  Address 0090.2B1B.B40B  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/2 Desg FWD 19 128.2 P2p  Po12 Root FWD 3 128.27 Shr  VLAN0103  Spanning tree enabled protocol rstp  Root ID Priority 20583  Address 0090.2B1B.B40B  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 20583 (priority 20480 sys-id-ext 103)  Address 0090.2B1B.B40B  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/6 Desg FWD 19 128.6 P2p  Po12 Desg FWD 3 128.27 Shr  VLAN0104  Spanning tree enabled protocol rstp  Root ID Priority 24680  Address 0090.2B1B.B40B  This bridge is the root  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 24680 (priority 24576 sys-id-ext 104)  Address 0090.2B1B.B40B  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/5 Desg FWD 19 128.5 P2p  Po12 Desg FWD 3 128.27 Shr  **SW3#sh spanning-tree**  VLAN0002  Spanning tree enabled protocol rstp  Root ID Priority 24578  Address 00D0.5841.0E1A  Cost 19  Port 2(FastEthernet0/2)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32770 (priority 32768 sys-id-ext 2)  Address 000A.415A.8981  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/2 Root FWD 19 128.2 P2p  Fa0/3 Altn BLK 19 128.3 P2p  VLAN0101  Spanning tree enabled protocol rstp  Root ID Priority 24677  Address 00D0.5841.0E1A  Cost 19  Port 2(FastEthernet0/2)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32869 (priority 32768 sys-id-ext 101)  Address 000A.415A.8981  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Desg FWD 19 128.1 P2p  Fa0/2 Root FWD 19 128.2 P2p  Fa0/3 Altn BLK 19 128.3 P2p  **SW4#sh spanning-tree**  VLAN0002  Spanning tree enabled protocol rstp  Root ID Priority 24578  Address 00D0.5841.0E1A  Cost 19  Port 1(FastEthernet0/1)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32770 (priority 32768 sys-id-ext 2)  Address 0060.3E84.AC8C  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Root FWD 19 128.1 P2p  VLAN0102  Spanning tree enabled protocol rstp  Root ID Priority 24678  Address 00D0.5841.0E1A  Cost 19  Port 1(FastEthernet0/1)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32870 (priority 32768 sys-id-ext 102)  Address 0060.3E84.AC8C  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Root FWD 19 128.1 P2p  Fa0/2 Desg FWD 19 128.2 P2p  **SW5#sh spanning-tree**  VLAN0002  Spanning tree enabled protocol rstp  Root ID Priority 24578  Address 00D0.5841.0E1A  Cost 19  Port 1(FastEthernet0/1)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32770 (priority 32768 sys-id-ext 2)  Address 0006.2ABC.9906  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Root FWD 19 128.1 P2p  Fa0/2 Altn BLK 19 128.2 P2p  VLAN0103  Spanning tree enabled protocol rstp  Root ID Priority 20583  Address 0090.2B1B.B40B  Cost 19  Port 2(FastEthernet0/2)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32871 (priority 32768 sys-id-ext 103)  Address 0006.2ABC.9906  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Altn BLK 19 128.1 P2p  Fa0/2 Root FWD 19 128.2 P2p  Fa0/3 Desg FWD 19 128.3 P2p  **SW6#sh spann**  VLAN0002  Spanning tree enabled protocol rstp  Root ID Priority 24578  Address 00D0.5841.0E1A  Cost 22  Port 1(FastEthernet0/1)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32770 (priority 32768 sys-id-ext 2)  Address 0050.0F81.9522  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Root FWD 19 128.1 P2p  VLAN0104  Spanning tree enabled protocol rstp  Root ID Priority 24680  Address 0090.2B1B.B40B  Cost 19  Port 1(FastEthernet0/1)  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Bridge ID Priority 32872 (priority 32768 sys-id-ext 104)  Address 0050.0F81.9522  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  Aging Time 20  Interface Role Sts Cost Prio.Nbr Type  ---------------- ---- --- --------- -------- --------------------------------  Fa0/1 Root FWD 19 128.1 P2p  Fa0/2 Desg FWD 19 128.2 P2p |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

### T04-05 DHCP协议

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| --- | --- |
| 验收目的 | 检查本节点DHCP协议是否正常。 |
| 预置条件 | 设备加电运行正常，DHCP协议收敛完成，涉及SW1—SW2。 |
| 测试过程 | 1、在PC端进行IP地址获取操作。  2、使用show ip dhcp binding命令，查看DHCP地址分配信息是否正常。  3、在PC端进行IP释放操作  4、在PC端重新获取IP。 |
| 预期结果 | 本节点DHCP 运行正常，符合拓扑要求：  1、  2、  SW1#sh ip dhcp binding  IP address Client-ID/ Lease expiration Type Hardware address  10.134.1.2 00D0.FFC4.9635 -- Automatic  3、    4、    5、SW2#sh ip dhcp binding  IP address Client-ID/ Lease expiration Type Hardware address  10.134.3.2 00D0.5829.591D -- Automatic  6、 |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

### T04-06 PPP协议

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| --- | --- |
| 验收目的 | 检查本节点PPP协议是否正常。 |
| 预置条件 | 设备加电运行正常，PPP协议收敛完成，涉及R1、R3。 |
| 测试过程 | 1. 关闭串行端口； 2. 开启串行端口，重新进行PPP链路建立； 3. 使用 ping x.x.x.x 对端地址进行PING测， |
| 预期结果 | 重启端口后，PPP链路建立成功。  R1(config)#int s0/2/0  R1(config-if)#shut  R1(config-if)#no shut  R1(config-if)#do ping 10.134.130.130  Type escape sequence to abort.  Sending 5, 100-byte ICMP Echos to 10.134.130.130, timeout is 2 seconds:  !!!!!  Success rate is 100 percent (5/5), round-trip min/avg/max = 1/7/15 ms  R3(config)#int s0/2/0  R3(config-if)#shut  R3(config-if)#no shut  R3(config-if)#do ping 10.134.130.129  Type escape sequence to abort.  Sending 5, 100-byte ICMP Echos to 10.134.130.129, timeout is 2 seconds:  !!!!!  Success rate is 100 percent (5/5), round-trip min/avg/max = 1/5/17 ms |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

**T05 业务测试**

### T05-01 全网终端互通性测试

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| --- | --- |
| 验收目的 | 检查全网终端是否按设计实现互联互通。 |
| 预置条件 | 设备加电运行正常，测试数据配置完成。  1. 测试环境搭建完成。 2. 涉及PC1—PC6 |
| 测试过程 | 1. 各PC之间两两ping测，测试互通性。 |
| 预期结果 | 1. 除宿舍（PC2、PC4）不能访问服务器（PC1）外，其余都可访问。   **在PC2端对PC1、PC3-PC6进行ping测，结果如下：**    **在PC4端对PC1进行ping测，结果如下：** |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

### T05-02 外网访问测试

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| 验收目的 | 检查各PC是否能正常访问外网。 |
| 预置条件 | 设备加电运行正常，测试数据配置完成。  1. 测试环境搭建完成。 2. 涉及PC1—PC6。 |
| 测试过程 | 1. 各PC对外网地址进行ping测，ping 100.0.0.1。 |
| 预期结果 | 所有PC都可对外网进行访问。 |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

### T05-03 telnet业务测试

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| 验收目的 | 检查telent是否正常。 |
| 预置条件 | 设备加电运行正常，测试数据配置完成。  1. 测试环境搭建完成。 2. 涉及R1—R3, SW1—SW6。 |
| 测试过程 | 1. 使用图书馆PC对设备进行telent。 2. 使用非图书馆PC对设备进行telent。。 |
| 预期结果 | 只有图书馆PC可对设备进行telnet。   1. **对R1进行测试:**      1. **对R2进行测试：**      1. **对R3进行测试：**     **4、在PC2、PC3端分别对SW1-SW6进行测试：** |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |

### T05-04冗余测试

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| --- | --- |
| 验收目的 | 进行冗余测试，当网络出现单点故障时是否会影响业务。 |
| 预置条件 | 设备加电运行正常，测试数据配置完成。  1. 测试环境搭建完成。 2. 涉及全网所有设备 |
| 测试过程 | 1. 在SW3（应该在PC1上，但模拟器中PC不支持扩展ping）上对外网业务进行traceroute。 2. 在SW3（应该在PC1上，但模拟器中PC不支持扩展ping）上对外网业务进行PING长包。 3. 关闭SW1 int vlan 11接口（模拟器存在bug，应该关闭F0/1接口，但F0/1关闭后vlan11不能down），查看SW3 ping测是否中断； 4. 在SW3上再次对外网业务进行traceroute，看路径是否切换。 5. 在SW3（应该在PC1上，但模拟器中PC不支持扩展ping）上对外网业务进行PING长包。 6. 打开SW1 int vlan 11接口，查看SW3 ping测是否中断； 7. 在SW3上再次对外网业务进行traceroute，看路径是否切换。 |
| 预期结果 | 当网络出现单点故障时，会有少许丢包，然后业务恢复。   1. SW3 traceroute 100.0.0.1；     2、SW3 ping 100.0.0.1；    3、关闭SW1上行接口      4、在SW3再次 traceroute 100.0.0.1；对比步骤1路径，发现流量转发路径进行了切换。    5、SW3 ping 100.0.0.1；    6、打开SW1上行接口      7、在SW3再次 traceroute 100.0.0.1；对比步骤1和4路径，发现流量转发路径进行了切换。 |
| 测试结果 | 通过 ☑ 未通过 □ 不涉及 □ |
| 测试说明 |  |