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above depicts a basic deployment scenario. Provider edge (PE) router 1, P, and PE2 form a 6VPE cloud. The customer edge (CE) router 1 to PE1 connection is IPv6 (VRF). The PEs are HA/SSO and NSF capable. The P routers are capable of Multiprotocol Label Switching (MPLS) label preservation (NSF equivalent). As the CE1 is customer equipment, the provider cannot determine that it must be upgraded to be NSF aware. If PE1 can perform NSR on its connections within the autonomous system, the operations may be NSF or graceful restart. This means the control plane will be reset, and all the immediate peers will be aware of it and will resend data to help re-establish the session, but forwarding will be uninterrupted. Neighbors not operating under NSF aware (that is, it can handle a BGP graceful restart by its peers), then the PE-CE connection will not be NSR, and will instead follow the regular NSF processing model. This parallels NSR for VPNv4 and assists in conserving network resources. Page 18 The EIGRP IPv6 NSF/GR feature supports three types of timers: the signal timer, the converge timer, and the graceful-restart purge-time timer. Configure the signal timer to adjust the maximum

convergence. The default value for the signal timer is 20 seconds. The timers st signal command is used to configure the graceful-restart purge-time timer to adjust the maximum waiting time to receive the converge timer. Configure the converge timer. Configure the graceful-restart purge-time timer to adjust the maximum waiting time to receive the converge timer to adjust the maximum waiting time to receive the converge timer. Configure the graceful-restart purge-time timer is used when the SF and the configure the graceful-restart purge-time timer is used when the restarting neighbor and changes the stale routes from the restarting neighbor and changes the stale routes to active. This process allows EIGRP peers to find alternate routes instead of waiting during a long switchover operation. The default value for the graceful-restart purge-time timer is 240 seconds. The timers graceful-restart purge-time timer is 240 seconds. The timers graceful-restart purge-time timer is 1240 seconds. The timers graceful-restart purge-time timer is 1240 seconds. The timers graceful-restart purge-time timer is 240 seconds. The timers graceful-restart purge-time timer is 240 seconds. The timers graceful-restart purge-time timer is 1240 sec

Process Name: OSPF-1 Router Total Memory Held: 4454800 bytes In the above example, OSPF is using 4,454,800 bytes, or approximately 4.5 megabytes (MB). Because OSPF NSR can consume double this memory for brief periods, ensure that the device has at least 5 MB of free memory before enabling OSPF NSR. Page 21 The documentation set for this product strives to use bias-free language. For the purposes of this documentation set, bias-free is defined as language that does not imply discrimination based on age, disability, gender, racial identity, sexual orientation, socioeconomic status, and intersectionality. Exceptions may be present in the documentation due to language that is hardcoded in the user interfaces of the product. Learn more about how Cisco is using Inclusive Language that is used by a referenced third-party product. Learn more about how Cisco is using Inclusive Language that is used by a referenced third-party product. (ISP) or a network administrator that must connect a central site that is using OSPF to a remote site that is using a different routing protocol. Prior to NSSA, the connection between the corporate site border router and the remote site that is using a different routing protocol. area, and two routing protocols needed to be maintained. A simple protocol such as RIP was usually run and handled the redistribution. With NSSA, you can extend OSPF to cover the remote connection by defining the area between the corporate with distributed routes via Type 5 LSAs. Route redistribution into an NSSA area is possible only with a special type of LSA that is known as Type 7 that can exist only in an NSSA ABR translates the Type 7 LSA into a Type 5 LSA, which can be flooded throughout the whole OSPF routing domain. Summarization and filtering are supported during the translation. RFC 3101 allows you to configure an NSSA ABR router will unconditionally assume the role of LSA translator, preempting the default behavior, which would only include it among the candidates to be elected as translator. Note Even a forced translator might not translate all LSAs; translation depends on the contents of each LSA. The figure below shows a network diagram in which OSPF Area 1 is defined as the stub area. The Enhanced Interior Gateway Routing Protocol (EIGRP) routes cannot be propagated into the OSPF domain because routing redistribution is not allowed in the stub area. However, once OSPF Area 1 is defined as an NSSA, an NSSA ASBR can inject the EIGRP router will not be allowed into OSPF Area 1 because NSSA is an extension to the stub area. The stub area characteristics will still exist, including the exclusion of Type 5 LSAs. Route summary route to be advertised to other areas by an ABR. In OSPF, an ABR will advertise networks in one area into another area. If the network numbers in an area are assigned in a way such that they are contiguous, you can configure the ABR to advertise a summary route that covers all the individual networks within the area that fall into the specified range. When routes from other protocols are redistributed into OSPF (as described in the module "Configuring IP Routing Protocol Independent Features"), each route is advertised individually in an external LSA. However, you can configure the Cisco IOS software to advertise a single route for all the redistributed routes that are covered by a specified network address and mask. Doing so helps decrease the size of the OSPF link-state database. In OSPF, all areas must be connected to a backbone area. If there is a break in backbone continuity, or the backbone is purposefully partitioned, you can establish a virtual link. The two endpoints of a virtual link must be configured in both routers. The configuration information in each router consists of the other virtual endpoint (the other ABR) and the nonbackbone area that the two routers have in common (called the transit area). Note that virtual links cannot be configured through stub areas. You can force an ASBR to generate a default route into an OSPF routing domain, the router automatically becomes an ASBR. However, an ASBR does not, by default, generate a defaultroute into the OSPF routing domain. You can configure OSPF to look up Domain Naming System (DNS) names for use in all OSPF show EXEC command displays. by its router ID or neighbor ID. OSPF uses the largest IP address is removed, the OSPF process must recalculate a new router ID and resend all its routing information out its interfaces as its removed, the OSPF process must recalculate a new router ID and resend all its routing information out its interfaces. If a loopback interface is configured with an IP address, the Cisco IOS software will use this IP address as its router ID, even if other interfaces have larger IP addresses. Because loopback interface over any other kind, and it chooses the highest IP address among all loopback interfaces. If no loopback interfaces are present, the highest IP address in the router is chosen. You cannot tell OSPF to use any particular interface according to the bandwidth of the interface. For example, a 64-kbps link gets a metric of 1562, and a T1 link gets a metric of 64. The OSPF metric is calculated as the ref-bw value determined by the bandwidth value, with the ref-bw value determined by the bandwidth value, with the ref-bw value determined by the bandwidth value, with high bandwidth, you might want to specify a larger number to differentiate the cost on those links. An administrative distance is a rating of the trustworthiness of a routing information source, such as an individual router or a group of routers. Numerically, an administrative distance is an integer from 0 to 255. In general, the higher the value, the lower the trust rating. An administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored. OSPF uses three different administrative distances: intra-area; and routes from another routing domain learned via redistribution are external. The default distance for each type of route is 110. Because simplex interfaces between two devices on an Ethernet represent only one network segment, for OSPF from sending interface between two devices on an Ethernet represent only one network segment, for OSPF from sending interface. Both devices are able to see each other via the hello packet generated for the receiving interface. You can configure the held time between when OSPF receives a topology change and when it starts a shortest path first (SPF) calculation. You can also configure the hold time between two consecutive SPF calculations. The OSPF on-demand circuit is an enhancement to the OSPF protocol that allows efficient operation over on-demand circuits such as ISDN, X.25 switched virtual circuits. Prior to this feature, OSPF periodic hello and LSA updates would be exchanged between routers that connected the on-demand link, even when no changes occurred in the hello or LSA information. With this feature, periodic refreshes of LSAs are not flooded over the demand circuit. These packets bring up the link only when they are exchanged for the first time, or when a change occurred in the information they contain. This operation allows the underlying data link layer to be closed when the network topology is stable. This feature is useful when you want to connect telecommuters or branch offices to an OSPF backbone at a central site. In this case, OSPF for on-demand circuits allows the benefits of OSPF over the entire domain, without excess connection costs. Periodic refreshes of hello updates. LSA updates, and other protocol overhead are prevented from enabling the on-demand circuit when there is no "real" data to send. Overhead protocols such as hellos and LSAs are transferred over the on-demand circuit when there is no "real" data to send. Overhead protocols such as hellos and LSAs are transferred over the on-demand circuit when there is no "real" data to send. Overhead protocols such as hellos and LSAs are transferred over the on-demand circuit when there is no "real" data to send. Overhead protocols such as hellos and LSAs are transferred over the on-demand circuit when there is no "real" data to send. Overhead protocols such as hellos and LSAs are transferred over the on-demand circuit when there is no "real" data to send. changes to the topology that require new SPF calculations are sent in order to maintain network topology integrity. Periodic refreshes that do not include changes, however, are not sent across the link. The OSPF LSA group pacing feature allows the router to group OSPF LSA group pacing feature allows the router to group of the router to group pacing results in more efficient use of the router. The router groups OSPF LSAs and paces the refreshing, checksumming, and aging functions so that sudden increases in CPU usage and network resources are avoided. This feature is most beneficial to large OSPF networks. OSPF LSAs group pacing is enabled by default. For typical customers, the default group pacing interval for refreshing, checksumming, and aging is appropriate and you need not configure this feature. Page 23 The IS-IS MIB table entries, MIB objects and MIB trap notification objects that comprise the Cisco private

MIB CISCO-IETF-ISIS-MIB.my. New CLI has been added to enable SNMP notifications for IS-IS MIB objects. Notifications for IS-IS MIB to receive the SNMP notifications, refer to the How to Enable IS-IS MIB. The ciiManAreaAddrEntry table contains the set of area addresses manually configured for the IS. The ciiManAreaAddrEntry table groups sets of relevant area addresses reported in all Level 1 link-state packets (LSPs) that were generated or received by an IS from other ISs that are reachable through Level 1 routing. Each entry contains one area address per LSP. The ciiAreaAddrEntry table contains a manually configured set of protocols supported by the IS. The supported protocol types are IPv4, IPv6, and ISO8473. The

time of the initial restart period. The restarting device sends hello packets with the restart-signal (RS) bit set. If the restarting device has not learned about any neighbor or has not received all updates from neighbors when the timer expires, the Routing Information Base (RIB) is notified for

support plants that is being the billing 190 object a probability of the common of the	