The following table contains the Routing Requirements contained in ITU-T G.8080, G.7715 and G.7715.1 and attempts to identify the corresponding text in IETF RFC 4258 and RFC 4652. Q14/15's comments are provided regarding how well the IETF Text reflects the ITU-T Requirements Text.

N	ITU-T Requirements Text	IETF Text	Comments
1	*G.8080 (2000) Sec 6.2:* Within the context of this Recommendation a routing area exists within a single layer network. *G.7715.1 (2004) Sec 9.5.1:* Layer Specific Characteristics • Link Weight • Resource Class • Local Connection Type	*RFC4258 Sec 3.5:* Routing for transport networks is performed on a per-layer basis, where the routing paradigms MAY differ among layers and within a layer. *RFC4652 Sec 5.3.1:* Link Attributes represent layer resource capabilities and their utilization i.e. the IGP should be able to advertise these attributes on a per-layer basis.	Per-layer characteristics requirements found in G.8080, G.7715.1 are not maintained in RFC 4652.
2	*G.7715.1 (2004) Sec 5.2.1:* The routing architecture allows for support of multiple routing protocols. This is achieved by instantiating different protocol controllers. The architecture does not assume a one-to-one correspondence between Routing Controller instances and Protocol Controller instances.	*RFC4258 Sec 1:* The architecture does not assume a one-to-one correspondence between a routing protocol and an RA level, and allows the routing protocol(s) used within different RAs (including child and parent RAs) to be different. *RFC4258 Sec 5:* A network is subdivided into ASON RAs, which MAY support multiple routing protocols; no one-to-one relationship SHALL be assumed.	The requirement stated in Section 1 is incorrect – multiple protocols *can* exist within one RA, with the protocols sharing the same TE information. The statements at the beginning of RFC 4258 Section 5 ("Conclusions") seem to reduce the standing of the requirements listed. These statements include: "This description is only conceptual" "In summary, the ASON routing architecture assumes:"

3	*G.7715 (2002) Sec 5.3.1, Par 4:* In the context of interactions between Routing Controllers at different levels of the hierarchy, it is important to note that information received from the parent RC shall not be circulated back to the parent RC. *G.7715.1 (2004) Sec 8.1.1.4, Par 1:* In order to prevent such potential loops, there is a requirement for the routing protocol to differentiate between routing information generated within the level of the receiving RC and information that has been received from higher or lower levels, even when this is forwarded by another RC at the same level. *G.7715.1 (2004) Sec 8.1.1.4, Par 1:* [T]he link state routing protocol must include a method to prevent re-introduction of information propagated into the Level N RA from the Level N+1 RA back into the Level N+1 RA, and vice versa.	*RFC4258 Sec 3.2:* When both upward and downward information exchanges contain endpoint reachability information, a feedback loop could potentially be created. Consequently, the routing protocol MUST include a method to: - prevent information propagated from a Level N+1 RA's RC into the Level N RA's RC from being re-introduced into the Level N+1 RA's RC, and - prevent information propagated from a Level N-1 RA's RC into the Level N RA's RC from being re-introduced into the Level N-1 RA's RC. *RFC4652 Sec 4:* [T]he routing protocol must deliver [a] mechanism to prevent re-introduction of information propagated into the Level N RA's RC back to the adjacent level RA's RC from which this information has been initially received.	RFC4258 has scoped the requirement to reachability information. Topology information may also be exchanged between parent and child Routing Areas. The requirement has been appropriately captured in RFC4652.

4	*G.7715 (2002) Sec 6.1, Bullet 1:* Information exchanged between routing controllers is subject to policy constraints imposed at the reference points.	*RFC4258 Sec 5:* The routing information exchanged between RCs SHALL be subject to policy constraints imposed at reference points. *RFC4652:* Not found	The statements at the beginning of RFC 4258 Section 5 (“Conclusions”) seem to reduce the standing of the requirements listed. These statements include: “This description is only conceptual” ”In summary, the ASON routing architecture assumes:” This is especially problematic given that many of the requirements in Section 5 (“Conclusions”) are not included anywhere in the body text. The requirement has not been captured in RFC 4652.
5	*G.7715 (2002) Sec 6.1, Bullet 2:* A routing performer operating in a routing area should not be dependent upon the routing protocol(s) that are being used in any other routing area.	*RFC4258 Sec 5:* The routing information exchanged within the parent RA SHALL be independent of both the routing protocol operating within a child RA *RFC4652 Sec 4:* Use of a routing protocol within a RA should not restrict the choice of routing protocols for use in other RAs (child or parent).	The statements in the beginning of RFC 4258 Section 5 (“Conclusions”) seem to reduce the standing of the requirements listed. These statements include: “This description is only conceptual” ”In summary, the ASON routing architecture assumes:” This is especially problematic given that many of the requirements in Section 5 (“Conclusions”) are not included anywhere in the body text. The requirement is adequately captured.

6	*G.7715 (2002) Sec 6.1, Bullet 3:* The routing information exchanged between routing control domains is independent of intra-domain protocol choices.	*RFC4258 Sec 5:* The routing information exchanged within the parent RA SHALL be independent of […] the routing protocol operating within a child RA *RFC4652 Sec 4:* Use of a routing protocol within a RA should not restrict the choice of routing protocols for use in other RAs (child or parent).	The statements in the beginning of RFC 4258 Section 5 (“Conclusions”) seem to reduce the standing of the requirements listed. These statements include: “This description is only conceptual” ”In summary, the ASON routing architecture assumes:” This is especially problematic given that many of the requirements in Section 5 (“Conclusions”) are not included anywhere in the body text. The requirement has been appropriately captured in RFC4652. It should be noted that it is not clear if this requirement is met by the proposed ASON routing solution draft (draft-ietf-ccamp-gmpls-ason-routing-ospf-04) given that the information used for prevention of looping uses OSPF Area IDs.

7	*G.7715 (2002) Sec 6.1, Bullet 4:* The routing information exchanged between routing control domains is independent of intra-domain control distribution choices, e.g., centralized, fully-distributed.	*RFC4258 Sec 5:* The routing information exchanged within the parent RA SHALL be independent of […] control distribution choice(s) *RFC4652:* Not found	The statements at the beginning of RFC 4258 Section 5 (“Conclusions”) seem to reduce the standing of the requirements listed. These statements include: “This description is only conceptual” ”In summary, the ASON routing architecture assumes:” This is especially problematic given that many of the requirements in Section 5 (“Conclusions”) are not included anywhere in the body text. The requirement has not been captured in RFC 4652.
8	*G.7715 (2002) Sec 6.1, Bullet 5:* The routing adjacency topology and transport network topology shall not be assumed to be congruent.	*RFC4258 Sec 1:* The routing adjacency topology (i.e., the associated Protocol Controller (PC) connectivity) and transport topology are NOT assumed to be congruent. *RFC4652:* Not found	The requirement has been appropriately captured in RFC4258. The requirement has not been captured in RFC 4652.
9	*G.7715 (2002) Sec 6.1, Bullet 6:* Each routing area shall be uniquely identifiable within a carrier’s network.	*RFC4258 Sec 3.1:* Each RA within a carrier's network SHALL be uniquely identifiable. *RFC4652, Sec 4:* Routing Areas (RAs) shall be uniquely identifiable within a carrier's network, each having a unique RA Identifier (RA ID) within the carrier's network.	The requirement has been appropriately captured in RFC4258. RFC 4652 has captured the requirement and expanded on it stating the need to have a unique RA ID, but not provided any details on how the RA IDs should be handled independent of the routing protocols in use in the various areas a carrier has in their network. (i.e. IS-IS/OSPF/PNNI heterogeneity)

10	*G.7715 (2002) Sec 6.1, Bullet 7:* The routing information shall support an abstracted view of individual domains. The level of abstraction is subject to operator policy.	*RFC4258 Sec 5:* The routing protocol SHALL support routing information based on a common set of information elements as defined in [G.7715] and [G.7715.1], divided between attributes pertaining to links and abstract nodes (each representing either a subnetwork or simply a node). [G.7715] recognizes that the manner in which the routing information is represented and exchanged will vary with the routing protocol used. *RFC4652, Sec 4:* The routing protocol shall support routing information based on a common set of information elements as defined in [G.7715] and [G.7715.1], divided between attributes pertaining to links and abstract nodes (each representing either a sub-network or simply a node). [G.7715] recognizes that the manner in which the routing information is represented and exchanged will vary with the routing protocol used.	RFC4258 and RFC 4652 have captured the requirement but limited the abstraction that can be provided to an abstract node – it seems to preclude use of an abstract topology.
11	*G.7715 (2002) Sec 6.1, Bullet 8:* The RP shall provide a means for recovering from system faults (e.g., memory exhaust).	*RFC4258:* Not found *RFC4652:* Not found	The requirement has not been captured in RFC 4258 or RFC 4652.

12	*G.7715 (2002) Sec 6.2, Bullet 1:* The routing protocol shall be capable of supporting multiple hierarchical levels.	*RFC4258, Sec 3:* The ASON routing architecture defines a multi-level routing hierarchy of RAs based on a containment model to support routing information abstraction. [G.7715.1] defines the ASON hierarchical link state routing protocol requirements for communication of routing information within an RA (one level) to support hierarchical routing information dissemination (including summarized routing information for other levels). *RFC4652, Sec 4:* [T]he routing protocol shall support dissemination of hierarchical routing information (including summarized routing information for other levels) in support of an architecture of multiple hierarchical levels of RAs.	The requirement has been appropriately captured in RFC4258. The existence of this requirement has only been eluded in RFC 4652.

13	*G.7715 (2002) Sec 6.2, Bullet 2:* The routing protocol shall support hierarchical routing information dissemination including summarized routing information.	*RFC4258, Sec 3:* The ASON routing architecture defines a multi-level routing hierarchy of RAs based on a containment model to support routing information abstraction. [G.7715.1] defines the ASON hierarchical link state routing protocol requirements for communication of routing information within an RA (one level) to support hierarchical routing information dissemination (including summarized routing information for other levels). *RFC4652, Sec 4:* [T]he routing protocol shall support dissemination of hierarchical routing information (including summarized routing information for other levels) in support of an architecture of multiple hierarchical levels of RAs.	The requirement has been appropriately captured in RFC4258 and 4652.
14	*G.7715 (2002) Sec 6.2, Bullet 3:* The routing protocol shall include support for multiple links between nodes and shall allow for link and node diversity.	*RFC4258, Sec 3.5.1:* Multiple SNPP links may be required when component links are not equivalent for routing purposes with respect to the RAs to which they are attached, to the containing RA, or when smaller groupings are required. *RFC4258, Sec 5:* The routing topology SHALL support multiple links between nodes and RAs. *RFC4652:* Not found.	The requirement has been appropriately captured in RFC4258. The requirement has not been captured in RFC 4652.
15	*G.7715 (2002) Sec 6.2, Bullet 4:* The routing protocol shall be capable of supporting architectural evolution in terms of number of levels of hierarchies, aggregation and segmentation of domains.	*RFC4258, Sec 3.4:* The routing protocol SHOULD be capable of supporting architectural evolution in terms of the number of hierarchical levels of RAs, as well as the aggregation and segmentation of RAs. *RFC4652:* Not found.	The requirement has been weakened in RFC 4258 and has not been captured in RFC4652.

16	*G.7715 (2002) Sec 6.2, Bullet 5:* The routing protocol shall be scalable with respect to the number of links, nodes, and routing area hierarchical levels.	*RFC 4258, Sec 5:* The number of hierarchical levels to be supported is routing protocol specific. *RFC 4652, Sec 4:* the number of hierarchical RA levels to be supported by a routing protocol is implementation specific.	The requirement stated in G.7715 does not match the statements in RFC 4258 and RFC 4652 - it is not clear how many hierarchical levels need to be supported.
17	*G.7715 (2002) Amd 1 (2007) Sec 6.2, Bullet 6:* The routing protocol shall be capable of supporting flexible distributions of ASON (G.8080) functional components to different physical computing systems.	*RFC 4258, Sec 5:* The routing information exchanged within the parent RA SHALL be independent of … control distribution choice(s), e.g., centralized, fully distributed. *RFC4652:* Not found.	Note: This requirement was added in 2007, and is not directly reflected in RFC 4258 and RFC 4652. It is a logical extension to G.7715 (2002) Sec 6.1, Bullet 4 discussed earlier.
18	*G.7715 (2002) Amd 1 (2007) Sec 6.2, Bullet 7:* The routing protocol shall be capable of supporting flexible cardinality (i.e., m:n) between ASON functional components as well as between ASON functional components and G.805 sub-networks.	*RFC 4258, Sec 5:* The routing information exchanged within the parent RA SHALL be independent of … control distribution choice(s), e.g., centralized, fully distributed. *RFC4652:* <Scenarios are discussed in 5.1, 5.3 and 6>	Note: This requirement was added in 2007, and is not directly reflected in RFC 4258 and RFC 4652. It is a logical extension to G.7715 (2002) Sec 6.1, Bullet 4 discussed earlier. The flexibility provided for by the requirement in G.7715 has been limited by the scenarios in RFC4652, as there is no case for m:1 for Ri:Li. It should be noted that it is not clear if this requirement is met by the proposed ASON routing solution draft (draft-ietf-ccamp-gmpls-ason-routing-ospf-04) given the optionality of the TE Router ID Link SubTLV.

19	*G.7715 (2002) Sec 6.2, Bullet 6:* In response to a routing event (e.g., topology update, reachability update) the contents of the RDB shall converge and a proper damping mechanism for flapping (chattering) shall be provided.	*RFC 4258, Sec 5:* The routing protocol SHALL converge such that the distributed RDBs become synchronized after a period of time. *RFC4652:* The routing protocol shall converge such that the distributed Routing DataBases (RDB) become synchronized after a period of time.	The statements at the beginning of RFC 4258 Section 5 ("Conclusions") seem to reduce the standing of the requirements listed. These statements include: "This description is only conceptual" "In summary, the ASON routing architecture assumes:" This is especially problematic given that many of the requirements in Section 5 ("Conclusions") are not included anywhere in the body text.
20	*G.7715 (2002) Sec 6.2, Bullet 7:* The routing protocol shall support or may provide add-on features for supporting a set of operator-defined security objectives where required.	*RFC 4258, Section 4:* The ASON routing protocol MUST deliver the operational security objectives where required. The overall security objectives (defined in ITU-T Recommendation [M.3016]) of confidentiality, integrity, and accountability may take on varying levels of importance. These objectives do not necessarily imply requirements on the routing protocol itself, and MAY be met by other established means. *RFC 4652, Section 8:* [RFC4258] describes the requirements for security of routing protocols for the Automatically Switched Optical Network. Reference is made to [M.3016], which lays out the overall security objectives of confidentiality, integrity, and accountability. These are well discussed for the Internet routing protocols in [THREATS].	The requirement has been appropriately captured in RFC4258 and RFC4652.

21	*G.7715 (2002) Sec 6.3, Bullet 1:* Path selection shall result in loop-free paths.	*RFC 4258:* Not found. *RFC 4652:* Not found.	The requirement has not been appropriately captured in RFC4258 and RFC4652. It could be argued that this is a fundamental tenant held by the routing experts in IETF making it unnecessary to state.
22	*G.7715 (2002) Sec 6.3, Bullet 2:* Path selection shall support at least one of the routing paradigms described in G.8080; i.e., hierarchical, source, and step-by-step.	*RFC 4285:* Not found. *RFC 4652:* Not found.	While RFC 4285 and RFC 4652 don't specifically contain this requirement, the text of these two RFCs is dedicated to providing a solution to hierarchical path selection.
23	*G.7715 (2002) Sec 6.3, Bullet 3:* Path selection shall be able to support a class of routing constraints as described in Section 10. *G.7715 (2002) Sec 10:* Examples of constraints are: • diversity • network performance objectives • management policies • transport layer specific constraints (possibly a link weight metric)	*RFC 4285:* Not found. *RFC 4652:* Not found.	The requirement has not been appropriately captured in RFC4258 and RFC4652.
24	*G.8080 (2002) Amd 1 (2003), Section 10:* There are three separate Transport names spaces in the ASON naming syntax 1. A Routing Area name space. 2. A subnetwork name space. 3. A link context name space. *G.7715.1 (2004) Sec 7.1, Bullet 3:* There are three categories of identifiers used for ASON routing: transport plane names, control plane identifiers for components, and SCN addresses.	*RFC 4258, Sec 3:* ASON routing components are identified by identifiers that are drawn from different name spaces (see [G.7715.1]). These are control plane identifiers for transport resources, components, and SCN addresses. *RFC 4652:* Not found.	The text in G.7715.1 has been captured in RFC 4258. The requirement has not been appropriately captured in RFC4652.

25	*G.7715.1 (2004) Sec 7.2, Par 2:* It should be noted that in order to maintain functional separation among the different ASON routing components, identifier spaces should be independent from each other, i.e., it should be possible to change the SCN addresses used for communication between the PCs without affecting the routing adjacency between peering PCs. This separation, however, does not mean that identical formats cannot be used. For example, an IPv4 address format may be used by multiple name spaces.	*RFC4258:* Not found *RFC4652, Sec 5.3:* when using OSPF or ISIS as the IGP in support of traffic engineering, [RFC3477] RECOMMENDS that the Li value (referred to the "LSR Router ID") be set to the TE Router ID value. Therefore, OSPF and IS-IS carry sufficient node identification information without further modification.	The requirement has not been appropriately captured in RFC4258. The text in RFC 4652 does not maintain the separation of namespaces described in G.7715.1. It should be noted that it is not clear if this requirement is met by the proposed ASON routing solution draft (draft-ietf-ccamp-gmpls-ason-routing-ospf-04) given the optional nature of carrying the Local/Remote TE Router ID SubTLV in a link advertisement.
26	*G.7715.1 (2004) Sec 8.1, Par 4:* Multiple RCs within an RA may transform and then forward information to RCs at different levels. However in this case the resulting information at the receiving level must be self-consistent; this may be achieved using a number of mechanisms.	*RFC4258, Sec 3.2:* Multiple RCs bound to the same RA MAY transform (filter, summarize, etc.) and then forward information to RCs at different levels. However, in this case, the resulting information at the receiving level must be self-consistent. *RFC4652, Sec 4:* Self-consistent information at the receiving level resulting from any transformation (filter, summarize, etc.) and forwarding of information from one Routing Controller (RC) to RC(s) at different levels when multiple RCs are bound to a single RA.	The requirement has been appropriately captured in RFC4258 and RFC4652.

27	*G.7715.1 (2004) Sec 8.1, Par 5:* An RP using a link state protocol must support the passing of reachability and topology information to and from its adjacent levels. *G.7715.1 (2004) Sec 8.1.1.2:* Level N+1 to Level N Reachability and Topology *G.7715.1 (2004) Sec 8.1.1.3:* Level N to Level N+1 Reachability and Topology	*RFC4258, Sec 3.2:* If routing information is exchanged between an RC, its parent, and its child RCs, it SHOULD include reachability (see Section 3.5.3) and MAY include, upon policy decision, node and link topology. *RFC4652, Sec 4:* Processing of routing information exchanged between adjacent levels of the hierarchy (i.e., Level N+1 and N), including reachability and (upon policy decision) summarized topology information.	The requirement has been captured in RFC 4258 and RFC 4652.
28	*G.7715.1 (2004) Sec 8.1.1.5:* Method for Interlevel RC communication	*RFC 4258:* <Section 3.2, item 3> *RFC 4652:* Not found	The requirement has been captured in RFC 4258. RFC 4652 does not include any information on how inter-level RC communication is to be performed.
29	*G.7715.1 (2004) Sec 8.4:* The protocol should support all the types of adjacencies described in G.7715/Y.1706, section 9.	*RFC 4258: Sec 3.3.2:* The routing protocol SHOULD support all the types of RC adjacencies described in Section 9 of [G.7715]. *RFC 4652:* Not found	The requirement has been captured in RFC 4258. The requirement has not been captured in RFC 4652.
30	*G.7715.1 (2004) Sec 9.1:* The routing protocol must be applicable to any transport network layer (e.g., G.805, G.872) and the representation of routing attributes should not preclude their applicability to other transport network levels, existing or future.	*RFC 4258:* Not found *RFC 4652:* Not found	The requirement has not been captured in RFC 4258 and RFC 4652. It is unclear how this requirement is being addressed in the OSPF routing solution.

31	*G.7715.1 (2004) Sec 9.3:* All advertisements contain a common set of administrative information elements. These elements are: • RA ID of which the advertisement is bounded. • RC ID of the entity generating the advertisement. • Information to uniquely identify advertisements. • Information to determine whether an advertisement has been updated. • Information to indicate when an advertisement comes from a different level.	*RFC 4258, Sec 3.5.2:* Advertisements MAY contain the following common set of information regardless of whether they are link or node related: - RA ID of the RA to which the advertisement is bounded - RC ID of the entity generating the advertisement - Information to uniquely identify advertisements - Information to determine whether an advertisement has been updated - Information to indicate when an advertisement has been derived from a different level RA *RFC 4652, Sec 4:* The routing protocol shall support routing information based on a common set of information elements as defined in [G.7715] and [G.7715.1]	The requirement has been captured in RFC 4258. RFC 4652 has captured the requirement by referencing G.7715.1.

32	*G.7715.1 (2004) Sec 9.4:* Reachability Information: Reachability information describes the set of endpoints that are reachable by the associated node. It may be advertised either as a set of UNI Transport Resource addresses/address prefixes, or a set of associated SNPP IDs/SNPP ID prefixes, the selection of which must be consistent within the applicable scope.	*RFC 4258, Sec 3.5.3:* Reachability information describes the set of endpoints that are reachable by the associated node. It MAY be advertised as a set of associated external (e.g., User Network Interface (UNI)) address/address prefixes or a set of associated SNPP link IDs/SNPP ID prefixes, the selection of which MUST be consistent within the applicable scope. *RFC 4652, Sec 4:* Reachability information may be advertised either as a set of UNI Transport Resource address prefixes, or as a set of associated Subnetwork Point Pool (SNPP) link IDs/SNPP link ID prefixes, assigned and selected consistently in their applicability scope.	The requirement has been captured in RFC 4258 and RFC 4652. It is unclear what method is being used with the OSPF routing solution. Specifically, it is unclear whether the information being carried in the Node IPv{4,6} Local Prefix Sub-TLV reachability attribute is carrying SNPP ID or UNI Transport Resource addresses information. It appears that it is an SNPP ID given that it seems to come from the same namespace as the Node IPv{4,6} Local Address SubTLV (as defined in draft-ietf-ospf-te-node-addr) which uses TE Router IDs. Not clarifying this in the OSPF routing solution draft could become a significant point for interoperability.