RUNE PROJECT CALL

REQUEST FOR FINAL OFFER

for the supply and integration of active network layer systems

Questions and answers

V2_27112019

November 2019

QUESTIONS N.1 – N.4

Based on received documentation we found qty misalignment between different files, as follows:

"RUNE_ACTIVE_RFFO_Appendix_11_AAN__List_07112019-1"
Slovenia: 42 locations, total 232.153 users connected
Croatia: 22 locations, total 111.107 users connected
(detailed list of locations and users connected for each OLT location)

"RUNE_ACTIVE_RFFO_Appendix_01_Agreed_minimum_technical_specifications_07112019-1"
Expected total end-user home connected number is 116.000 in Slovenia and 70.000,00 in Croatia (65:35 ratio), with possible home passed total end number 372.000

Q 1: Covered number of settlements is: ***(we should understand that settlement is referring OLT site?)***
2.971 in Slovenia and
705 in Croatia

ANSWER
This has nothing to do with OLT sites (it impacts only the number of passive access nodes, which has no influence on active layer).

There should be:
At least 352 legacy GPON OLTs (AAN) with 8 GPON ports and number can rise up to 500 (a 16 port 1U device is acceptable)
At least 20 XGS-PON OLT with 4 GPON ports systems inside the network and number can rise up to 35

Q 2: Please clarify how many sites and how many users connected per site we have to consider for each country (Croatia and Slovenia).
Q 3: Please specify if provided number of subscribers are total (GPON+XGS) and if we have to do the split (90%-10%)
Q 4: Please specify the max split ratio we have to consider for dimensioning.

ANSWER
There is a list of all AANs (42SLO +22HR) and the relative number of potential households already attached to the call (*RUNE_ACTIVE_RFFO_Appendix_11_AAN__List_07112019-1*). Use that one for reference. The prospected number of home connected for the Croatian part is higher due to a high number of summer residences, but please count as requested the 50% of home passed

QUESTIONS N.5 – N.6

Should we understand that:

- We need to use inputs from the Appendix 11 but users mentioned there are home passed and we need to consider only 50% as homes connected?

ANSWER
Yes

- We can go with a split of 1/128 for GPON part?

ANSWER
No, 1:64 split ratio.

QUESTION N.7

In RUNE_ACTIVE_RFFO_Appendix_01 – page 14, is mentioned that "DWDM equipment must support 50 GHz standard ITU channel spacing". On another paragraph it is requested a standard 40ch DWDM equipment utilizing at least 100 Gb capacity per wavelength with the possibility to provide 200Gbps and 400Gbps wavelengths in the future. Since 200Gbps and 400Gbps wavelengths may use different advanced modulation formats that may require signal bandwidths higher than 50GHz (example: 8QAM modulation format for 200Gbps wavelengths requires 62.5GHz signal bandwidth, Probabilistic Constellation Shaping - PCS may use also 75 GHz bandwidth signals) and moreover, the 40ch DWDM system may use 100GHz grid, please confirm that 50GHz grid requirement is not a mandatory one and vendors can offer 100GHz or even flex-grid spacing.

ANSWER

We agree and confirm, 50GHz grid requirement is not a mandatory one and vendors can offer 100GHz or even flex-grid spacing.

QUESTION N.8

In RUNE_ACTIVE_RFFO_Appendix_01 – page 15 is mentioned that "there will be a need to provide intermediate passive OADM in order to connect AAN location to AGGN location via DWDM infrastructure and not directly via private fiber link like all other AAN locations". Please confirm that connection between AAN node and AGGN node mentioned above is using 10Gbps capacity signal. How many 10Gbps signal are required between the above mentioned AAN and AGGN nodes ?

ANSWER

Yes, 10G, 4 channels required.

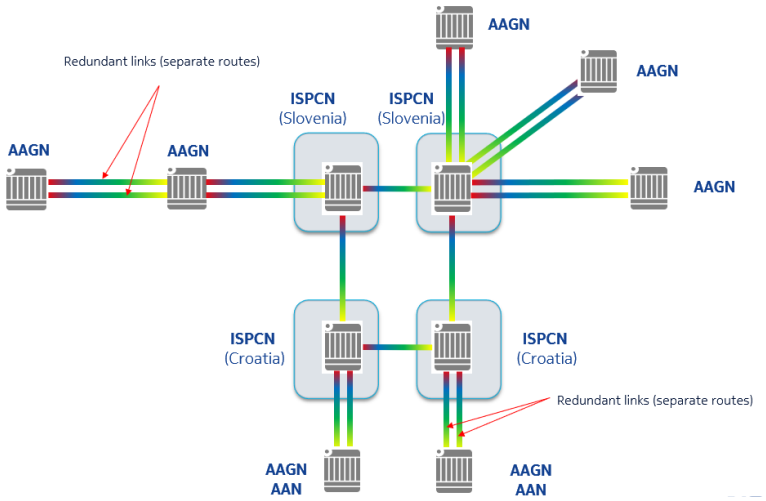
QUESTION N.9

In RUNE_ACTIVE_RFFO_Appendix_01 are written the following requirements:

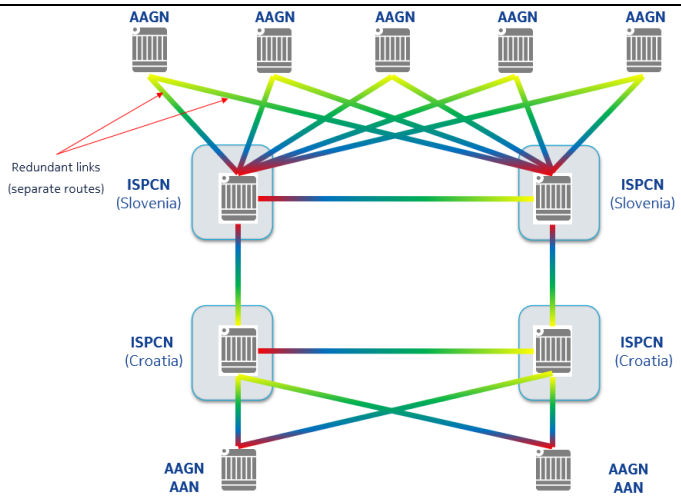
a. in page 3 is mentioned: five AGGN nodes in Slovenia with multiple AGGN devices, which must have redundant connection to both ISPCN nodes in Slovenia.
b. in page 7 chapter 1.2 is mentioned that "Connection between ISPCN and each AGGN node is done via two geographically independent fiber connections".
c. in page 10, chapter 1.5 it is mentioned that "Each AGGN device must be connected to all ISPCN locations in region".

Since the fiber optic cable network topology is not clear, you are kindly asked to precise which of the following **physical connectivity** diagrams are required for the DWDM network:

Option1:



Option2:



ANSWER

Option 2.

QUESTION N.10

In RUNE_ACTIVE_RFFO_Appendix_01 – page 14 it is mentioned that "All connections must be redundant using at least two data paths between each two connected nodes (AGGN to ISPCN or ISPCN to ISPCN)". Regarding the interconnections between ISPCN nodes in Slovenia, please precise if the main link is the direct(short) link between the two ISPCN nodes and the redundant link is the one passing through ISPCN nodes in Croatia or both optical links (main and redundant) are direct links between ISPCN nodes in Slovenia without passing any Croatian ISPCN node.

ANSWER

Connectivity between all ISPCN nodes is a RING topology, where Slovenian ISPCN nodes as well as Croatian ISPCN nodes are connected via up to 80km long single link to each other. Between ISPCN nodes in Slovenia and ISPCN nodes in Croatia the distance is up to 200km and each ISPCN to ISPCN connection is again just a single link. All four (4) links in this RING topology are in active-active mode.

QUESTION N.11

Can you please precise the distance between the two ISPCN locations in Slovenia ?

ANSWER

See previous answer. The second location is not yet identified, but it should be within Ljubljana area, or in worst case in Celje.

QUESTION N.12

Can you please precise the distance between the two ISPCN locations in Croatia?

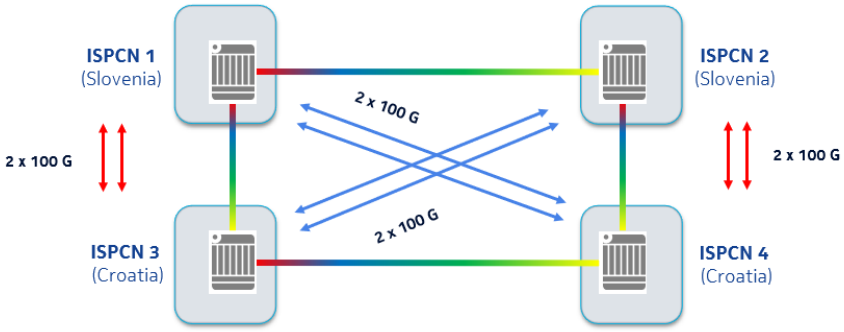
ANSWER

67 km, Matulji-Pazin.

QUESTION N.13

According to the RUNE_ACTIVE_RFFO_Appendix_01 – page 24, Network Topology, there are requested 2 DWDM connections that should transport 2x100 Gbps between ISPCN locations from Slovenia and ISPCN locations from Croatia: ISPCN1 (Slovenia) to ISPCN3 (Croatia) and ISPCN2 (Slovenia) to ISPCN4 (Croatia). Please, precise if there is

needed to transport 2x100 Gbps also between ISPCN1 (Slovenia) to ISPCN4 (Croatia) and ISPCN2 (Slovenia) to ISPCN3 (Croatia).



ANSWER

No, cross link not requested.

QUESTION N.14

How will the buyer react in case of incomplete offer from the bidder?

ANSWER

In case we receive an incomplete offer from the bidder we will examine the extent to which the offer is incomplete and we may follow one of the following paths:

- Declare invalid only the incomplete offer and evaluate all other complete offers;
- Call upon the bidder to provide the missing part of the offer;
- Or we may decide to declare the whole procurement procedure invalid and terminate the procedure without examining and/or choosing any of the other offers. In this case all the bidders will be asked to submit new offers in a new bidding procedure.

QUESTION N.15

Is it possible to offer only delivery of active devices (OLT, ONT devices), or only complete offers including designing, implementation, maintaining etc. will be allow and process? Basically, are partial offers acceptable or not?

ANSWER

Offers containing partial solutions will be treated as incomplete since they are not in line with the requests stated in the tender documentation.

In case we receive an incomplete offer we will examine the extent to which the offer is incomplete and we may follow one of the following paths:

- Declare invalid only the incomplete offer and evaluate all other complete offers;
- Call upon the bidder to provide the missing part of the offer;
- Or we may decide to declare the whole procurement procedure invalid and terminate the procedure without examining and/or choosing any of the other offers. In this case all the bidders will be asked to submit new offers in a new bidding procedure.

QUESTION N.16

Could you please confirm if the 4,8TB for the ISPCN is FD or HD?

ANSWER

Please explain the question a bit more.

QUESTION N.17

What is the max number of AGGN, which are planned for Croatia and Slovenia?

ANSWER

5 AGGN for Slovenia, 2 AGGN for Croatia.

QUESTION N.18

What is the expected switching fabric for the AGGN (ISCPN->4,8TB)?

ANSWER

No preference.

QUESTION N.19

Is it allowed to have overbooking on the AGGN?

ANSWER

It should be capable to scale to wirespeed, but some overbooking can be foreseen (in the delivered solution).

QUESTION N.20

Despite the RFQ demand that AAN proposal should be based on 1RU/2RU pizza box, after analyzing the input data regarding number of home passed and homes connected for each location, we revealed that an optimized design could be achieved if small but still modular platform will be used in part of the locations.

Please confirm that in part of AAN locations, when capacity of 1 pizza box is exceeded, a modular platform can be proposed.

We list here advantages of such modular solution, to be pursued when necessary:

- Step introduction of PON ports (GPON and/or XGS PON) is facilitated.
- Switching matrix will be dimensioned and provided per site and not per box. Consequently this will provide improvements in a) number of uplinks per site; b) CAPEX
- Reduction on number of fiber links and aggregation ports on AGGN
- Possibility to add additional services (i.e. P2P 10G anyhaul, etc.) without replacement of equipment (only adding respective service card)
- Technology mix can be deployed from single platform, no need to have dedicated platforms per technology (GPON / XGS)
- Options to add in future control redundancy or higher uplink capacity

ANSWER

As far as the capacity of a modular platform meets the requirements of the uplink port capacity on the OLT, we are fine, but please keep complexity as low as possible (ideally in this case, one type of pizza box and one type of modular platform), in a way to make the operation simpler. As said, uplink port capacity must equal the sum of capacity of the access ports.

QUESTION N.21

Document: RUNE_ACTIVE_RFFO_Appendix_01_Agreed_minimum_technical_specifications_07112019-1.pdf, Page 4 under General requirements for the active network layer: Documentation is talking about possibility of AAN OLT equipment to be connected:

- to same AGGN location but redundant to two hardware units inside same AGGN.
- to be connected to different AGGN locations, which is redundant by itself.
- to be connected to different AGGN locations in different regions (one link to Slovenian AGGN and one to Croatian AGGN).

Is it required in ALL mentioned cases to provide AAN "PON" connectivity in Active-Active state, where in case of one link failure end users should not notice disconnection of any of the links?

ANSWER

We understand that because network segmentation issues, there could be an interruption in case one of two links falls down in the "two different AGGNs" and "two AGGNs in different regions". In this case, a clear procedure of recovery of the service over the other link must be explained, if Active-Active state cannot be achieved.

QUESTION N.22

Document: RUNE_ACTIVE_RFFO_Appendix_01_Agreed_minimum_technical_specifications_07112019-1.pdf, Page 20 under ENERGY EFFICIENCY - Documentation is talking about UPS. Question: **Do we need to include UPS in our offer or this will be available in locations already?**

ANSWER

No, UPS will be provided by the supplier of the shelter (container).

QUESTION N.23

Document RUNE_ACTIVE_RFFO_Appendix_01_Agreed_minimum_technical_specifications_07112019-1.pdf, Page 14 under Assumptions based on worst-case scenario: There is a section in the document talking about the placement of OADM between two AGGN/ISPCN nodes connected via DWDM. Question: **Can you confirm that there is no power supply and cooling in the location where passive OADM will be placed?**

ANSWER

Yes, in the described case, OADM should be placed in a hardened case enclosure in an "inside-manhole-like" conditions, without any possible power supply.

QUESTION N.24

RUNE_ACTIVE_RFFO_Appendix_01_Agreed_minimum_technical_specifications_07112019-1.pdf, Page 14 under Assumptions based on worst-case scenario: There are 18 DWDM optical links, which are part of RuNe network:

- 10 of them connecting AGGNs in Slovenia to ISPCNs in Slovenia
- 4 of them interconnecting Slovenian and Croatian ISPCNs

- 4 of them in Croatia, which can be used to connect two (2) Croatian AGGNs in case they will be dislocated from Croatian ISPCN locations or these 4 links will be used to interconnect long distance end locations instead.

We assume that all these 18 optical links/fibers be terminated physically with a connection to patch panel locally in each location and bidder does not take into account any long optical fibers. **Can you confirm that there is no need to provide longer "last mile" optical patch cords as we will be connecting our equipment to patch panels locally in each location?**

ANSWER

We can confirm that "there is no need to provide longer "last mile" optical patch cords", where "longer" has to be understood as not for connecting to other buildings or locations.

QUESTION N.25

Document: RUNE_ACTIVE_RFFO_Appendix_01_Agreed_minimum_technical_specifications_07112019-1.pdf, Page 24 under Network Topology picture: There is AGGN in Slovenia without direct connection to ISPCN.

Is there availability of a free fiber pair in order to implement direct connection to ISPCN nodes in Slovenia or the traffic must pass through one of the AGGN nodes closer to ISPCNs?

ANSWER

In the above-mentioned case there is no direct fibre, and connection must be pass-through one of the AGGN nodes that are closer to ISPCN.

QUESTION N.26

For proper power supply selection purpose - Is there any location (AAN, AGGN, ISPCN) where -48VDC only is available?

ANSWER

All locations have 220VAC and -48VDC available.

QUESTION N.27

In case that AAN location is geographically closer than 40 km from AGGN, should 40km uplink optical modules be offered?

ANSWER

Yes.

QUESTION N.28

AAN locations might be connected via leased fiber or leased capacities (10GE service) – in case of leased capacities, should also be other type of uplink modules offered, like copper 10GE, rather than optical ones?

ANSWER

No, only optical, as we connect to the location where leased capacity location via fibre (leased capacity is not in the same location).

QUESTION N.29

In “RUNE_ACTIVE_RFFO_Appendix_01_Agreed_minimum_technical_specifications”, chapter “5. Energy Efficiency” it is stated that calculation of energy needs should be provided. Which requested document should include this information?

ANSWER

It has to be provided by the bidder in Appendix 2 - High level system design.

QUESTION N.30

According to RFFO documentation, there are planned multiple phases of building the network. If some AAN/AGGN location already successfully passed PAT/FAP for one phase, is it necessary to repeat PAT/FAT for each delivery-expansion?

ANSWER

Yes, each location of each layer of the network will have its own PAT/FAT procedure.

QUESTION N.31

In “RUNE_ACTIVE_RFFO_Appendix_10_FAT_07112019-1” for AAN, line 3, in Expected result, it is stated “with at least 20 residential end customer and 5 SOHO end customers”.

How should the contractor fulfil requirement of 20 residential and 5 SOHO end customers?
How does this fit with “RUNE_ACTIVE_RFFO_Draft_Supply_Agreement_07112019-1”, Article 12.3 – contractor should invite client for FAT?

ANSWER

It's obviously on the RUNE side to provide the above-mentioned number of users for the testing purposes. If RUNE fails to do so, a corresponding number of ONTs can be installed in the AAN node by the bidder to prove the functionality.