OSPF-TE Extensions for WSON-specific Network Element Constraints

draft-peloso-ccamp-wson-ospf-oeo-04

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3 main changes proposed by current draft

1. **INTRODUCTION of RESOURCE POOL**: atomic group of devices, for which properties share identical dynamicity.

   Rationale: a/ to formalize information aggregation,
   b/ to formalize flooding processes upon LSP updates.

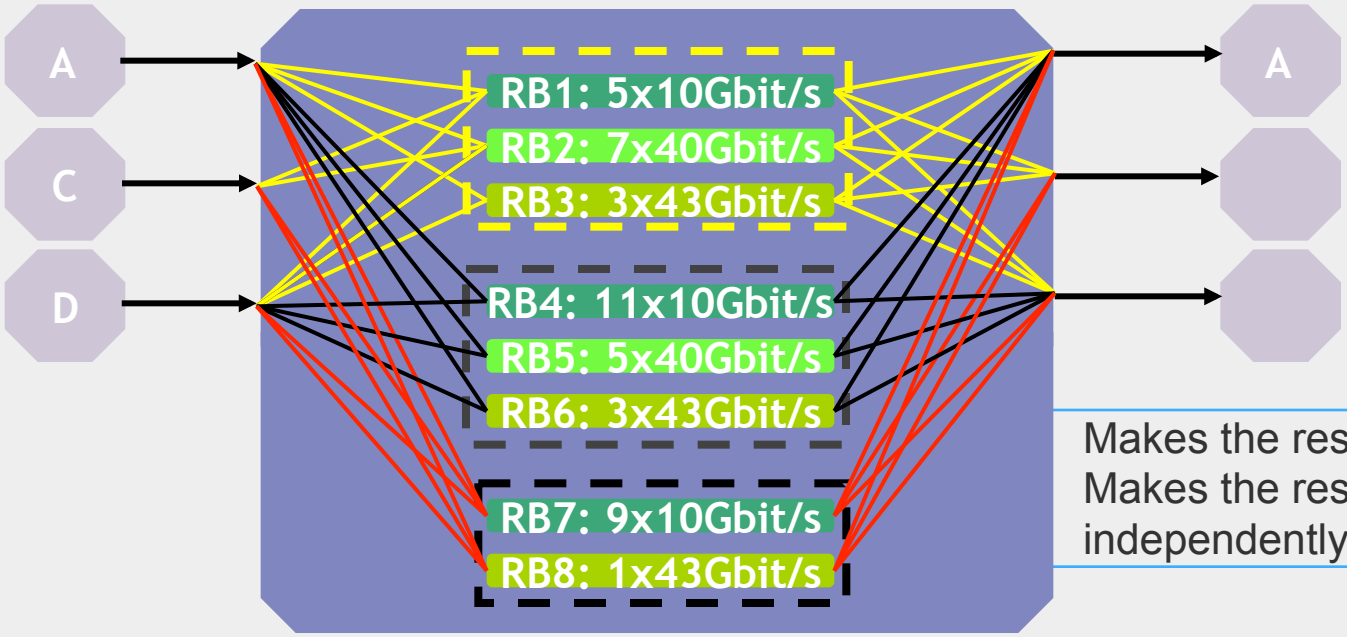
2. **USE of node's CONNECTIVITY MATRIX TLV**: to describe OEO devices connectivity constraints.

   Rationale: a/ Gather more static information inside node LSA,
   b/ Limit number of new TLVs.

3. **Enhance the Resource Block Strength**: took "NUMBER of DEVICES" off the Resource Block Information TLV.

   Rationale: a/ Use Resource Blocks compactness, while sharing resource descriptions for all identical devices,
   b/ Create independent flooding entity for all resource descriptions (static).

Modification 1 – Introduction of Resource Pool
Modification 1 –



Makes the resource pool an
Makes the resource pool an
independently floodable entity

Resource Block: a group of n OEOs

compacting entity

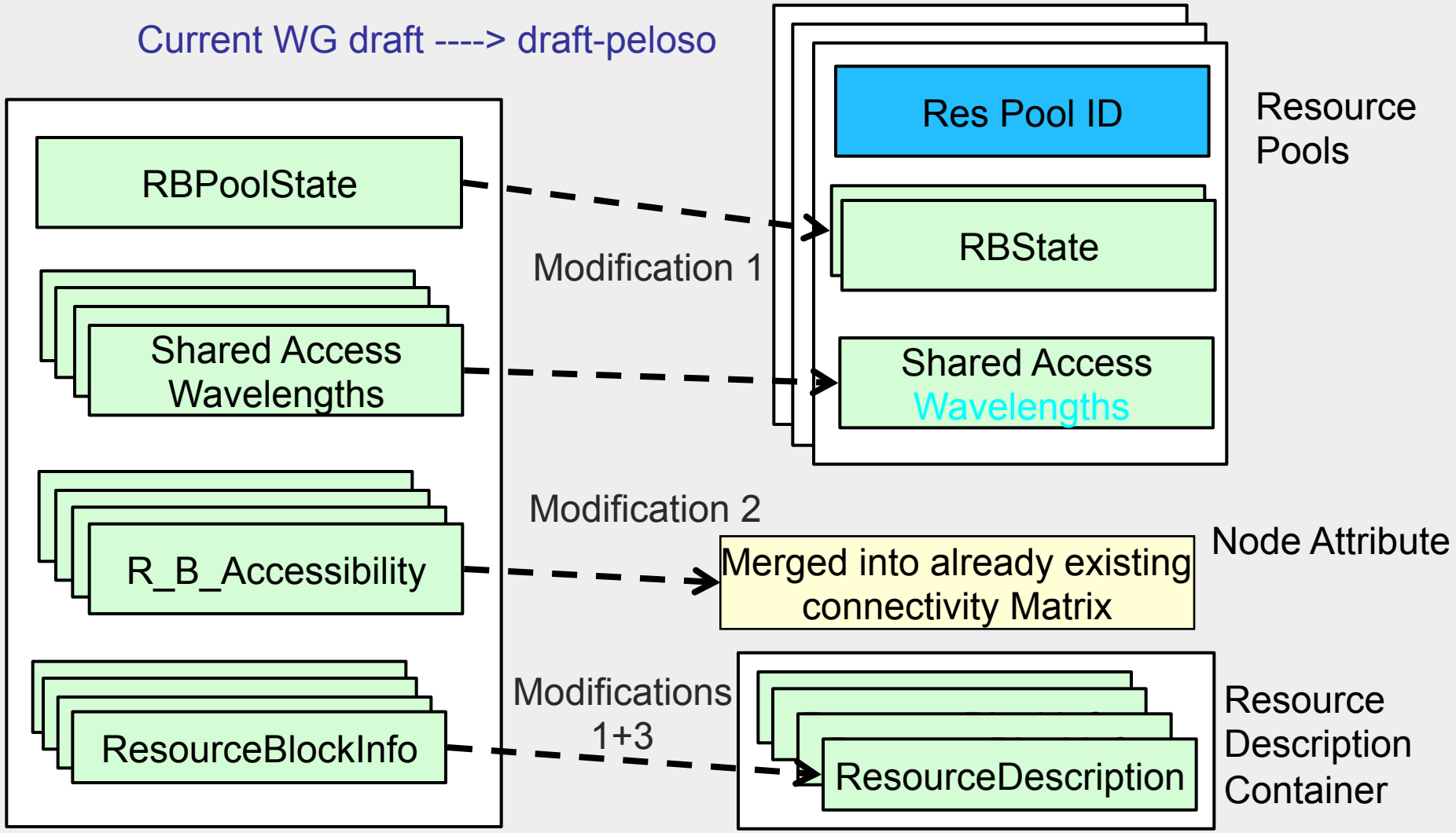
introduced by draft-ietf-ccamp-rwa-info as a

- same accessibility constraints
- same accessibility constraints

Resource Pools: a group of m Resource Blocks *introduced by draft-peloso*

<ResourcePool> ::= <ResourcePoolID> <ResourceBlockState>... (SharedAccessWavelengths>...)

Modification 1 – Introduction of Resource Pool
Detailed view of change

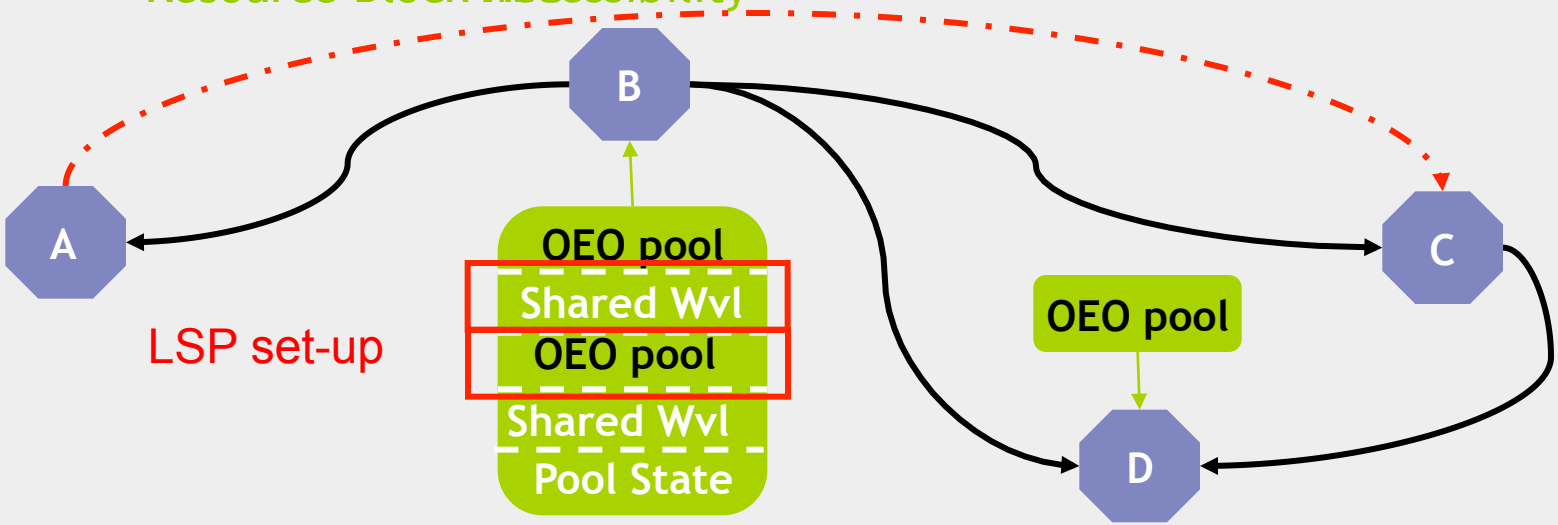


Modification 1 – Introduction of Resource Pool

- Have LSAs for WDM links with availability of wavelength (dynamic)
- Have 1 LSA for switching constraints of nodes (static)

multiple instances of TE-LSA:

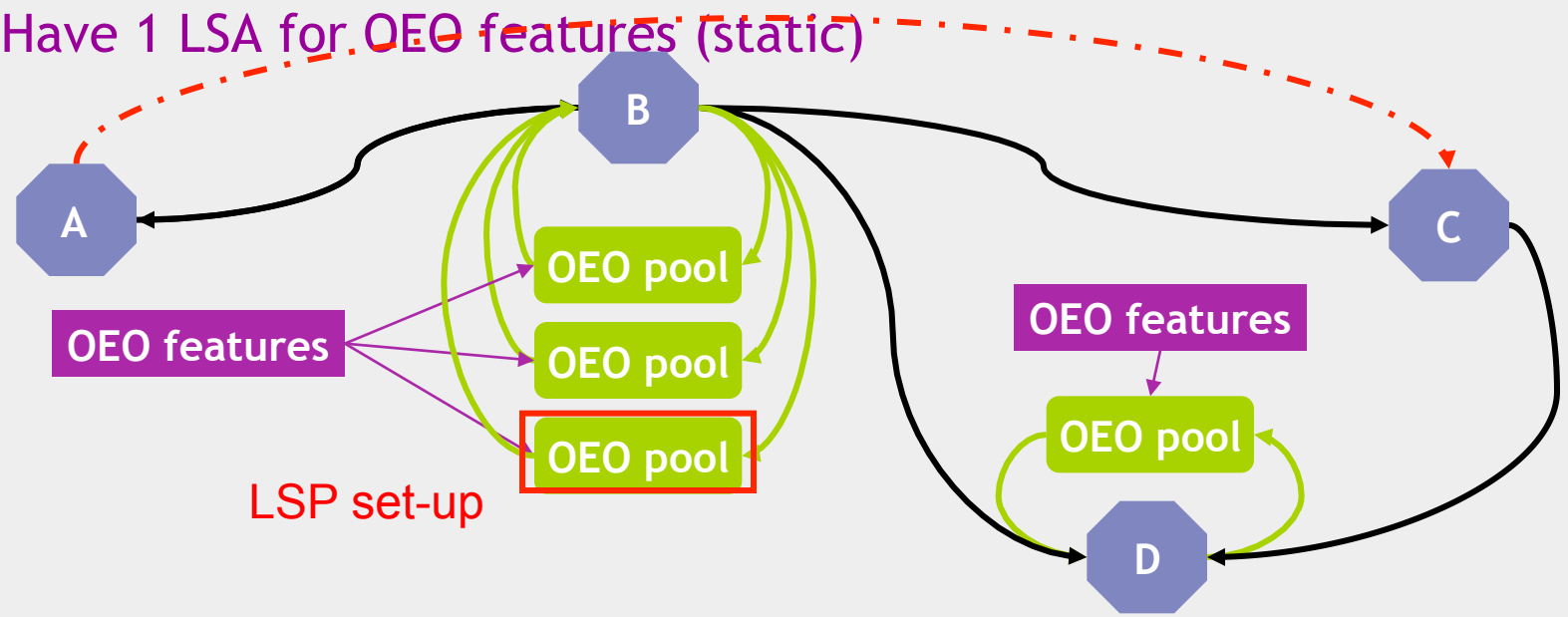
- Resource Block Accessibility



Modification 1 – Introduction of Resource Pool
Example with draft-peloso

Provide an OSPF-TE layout that intrinsically separates some static info from some dynamic ones, exploiting the concept of OEO pools

- Have LSAs for WDM links with availability of wavelength (dynamic)
- Have 1 LSA for switching constraints of nodes (static)
- Have LSAs for Resource Pools (dynamic: usage of wavelength & devices)
- Have 1 LSA for OEO features (static)



Modification 1 – Introduction of Resource Pool Pros and Cons

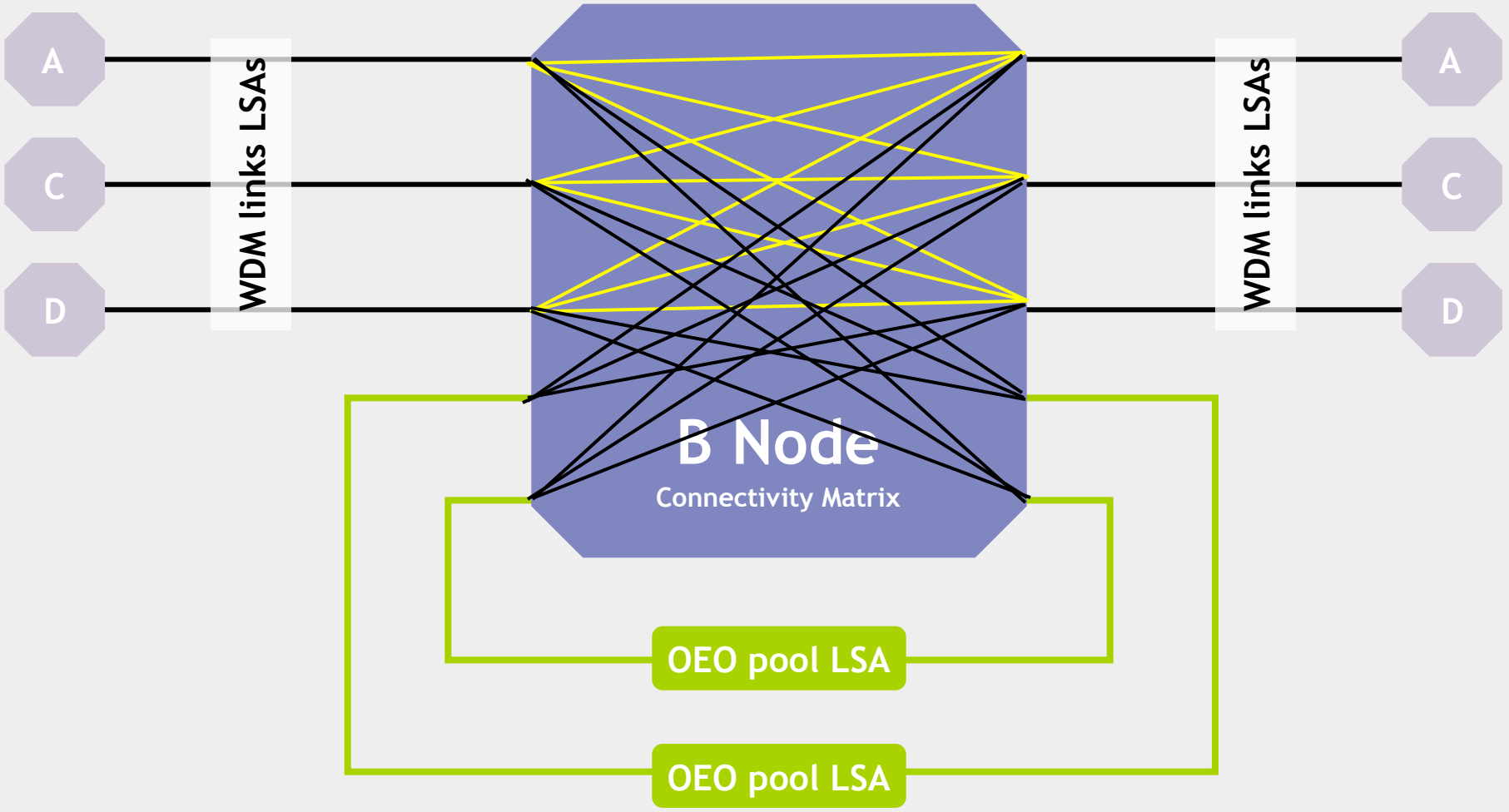
Pros:

- Formalized information structure
  - more predictable information size
  - insured coherence between wavelength usage and device usage
  - Defined behavior insuring consistency during re-boots of CP
- Formalized updating process
- Finer updates granularity (single pool update)

Cons:

- Introduction of a new level of ID
- In some cases, the overall information size can be better with current WG draft tuning the appropriate information layout

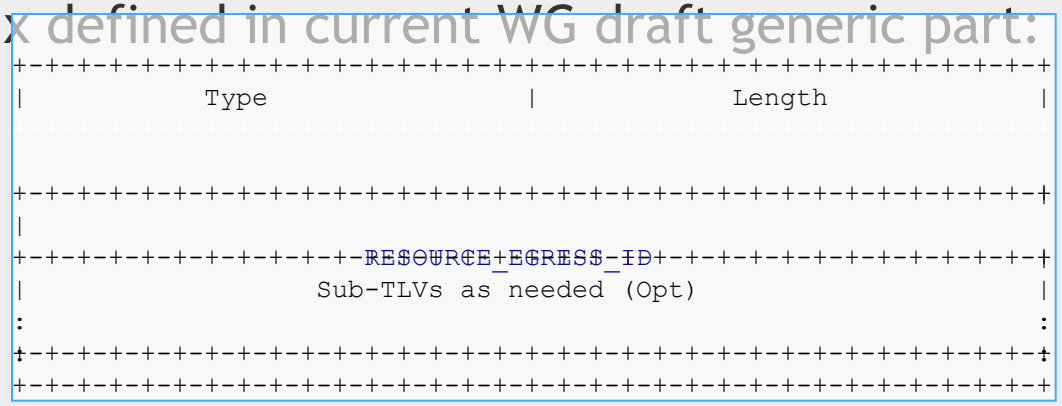
Modification 2 – USE of Node Connectivity Matrix TLV
High-level view of change

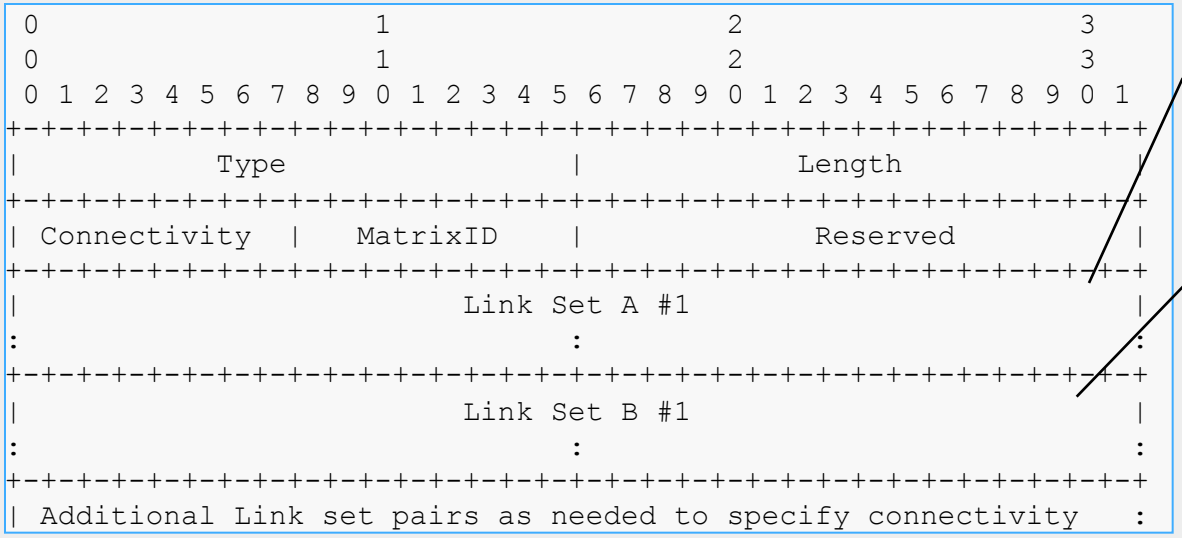


Modification 2 -

USE of Node Connectivity Matrix TLV

- Use the connectivity matrix defined in current WG draft generic part:
  - Needs IDs for Resource Pool ingress and Egress
  - Need no change on the





Composed of

Composed of

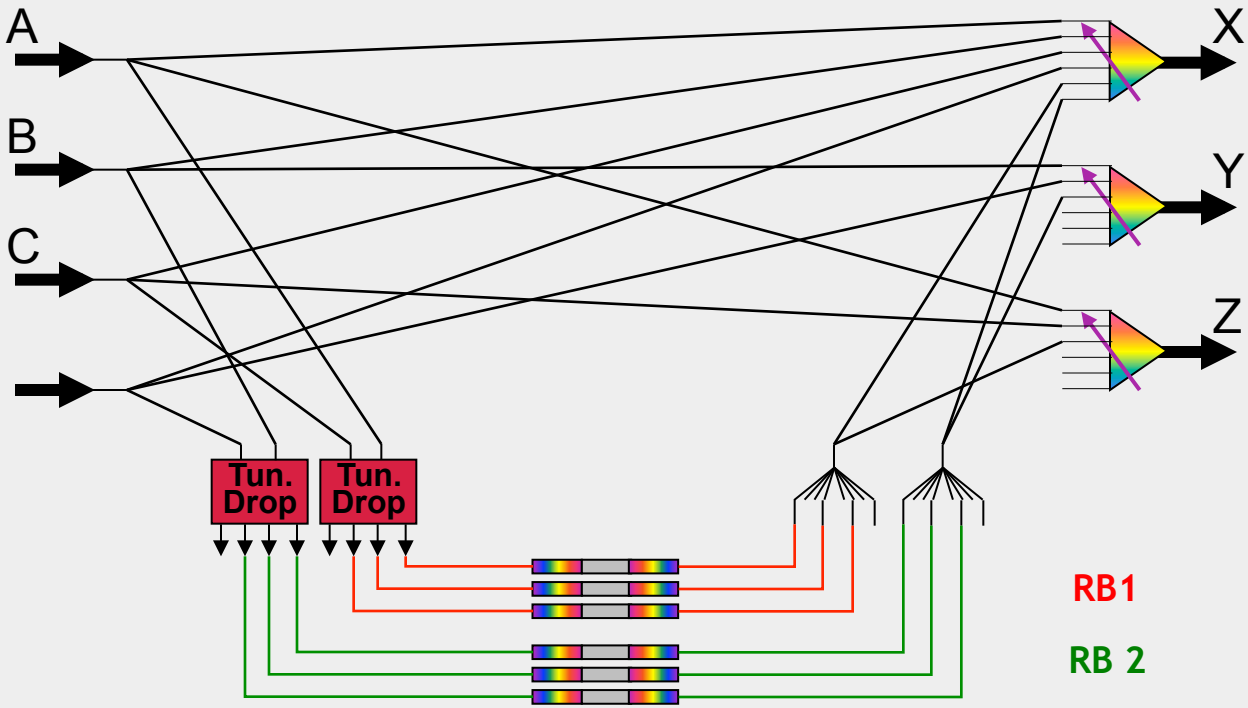
Resource Ingress ID

Modification 2 -

USE of Node Connectivity Matrix TLV

Node attribute TLV with connectivity matrix saying what can be connected:

- (Entering interfaces A, C and incoming RB1) to (outgoing interfaces X, Z and incoming RB1)
- (Entering interfaces A, C and incoming RB1) to (outgoing interfaces X, Z and incoming RB1)
- (Entering interfaces B, C and outgoing RB2) to (outgoing interfaces X, Z and incoming RB1)



Modification 2 - USE of Node Connectivity Matrix TLV Example with current WG draft

Node attribute TLV with connectivity matrix saying what can be connected:

- (Entering interfaces A and C) to (outgoing interfaces X and Z)
- (Entering interfaces B and D) to (outgoing interfaces X and Y)

Node property attribute TLV with connectivity matrix saying what can be connected:

- (Resource block 1) to (entering interfaces A and C)
- (Resource block 1) to (outgoing interfaces X and Z)
- (Resource block 2) to (entering interfaces B and D)
- (Resource block 2) to (outgoing interfaces X and Y)

draft-peloso needs the listing of 12 IDs.

current WG drafts needs the listing of 20 IDs.

Modification 2 - USE of Node Connectivity Matrix TLV Pros and Cons

while really similar – reuse of a generic object

- Gathering all connectivity info may compress information

Cons:

- Is sometimes interpreted as a mix of wson-specific and generic elements

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Modification 3 – Enhance Resource Block strength

Modification : Describe the resource properties instead of the resource
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associating RB IDs to Resource Block Information,

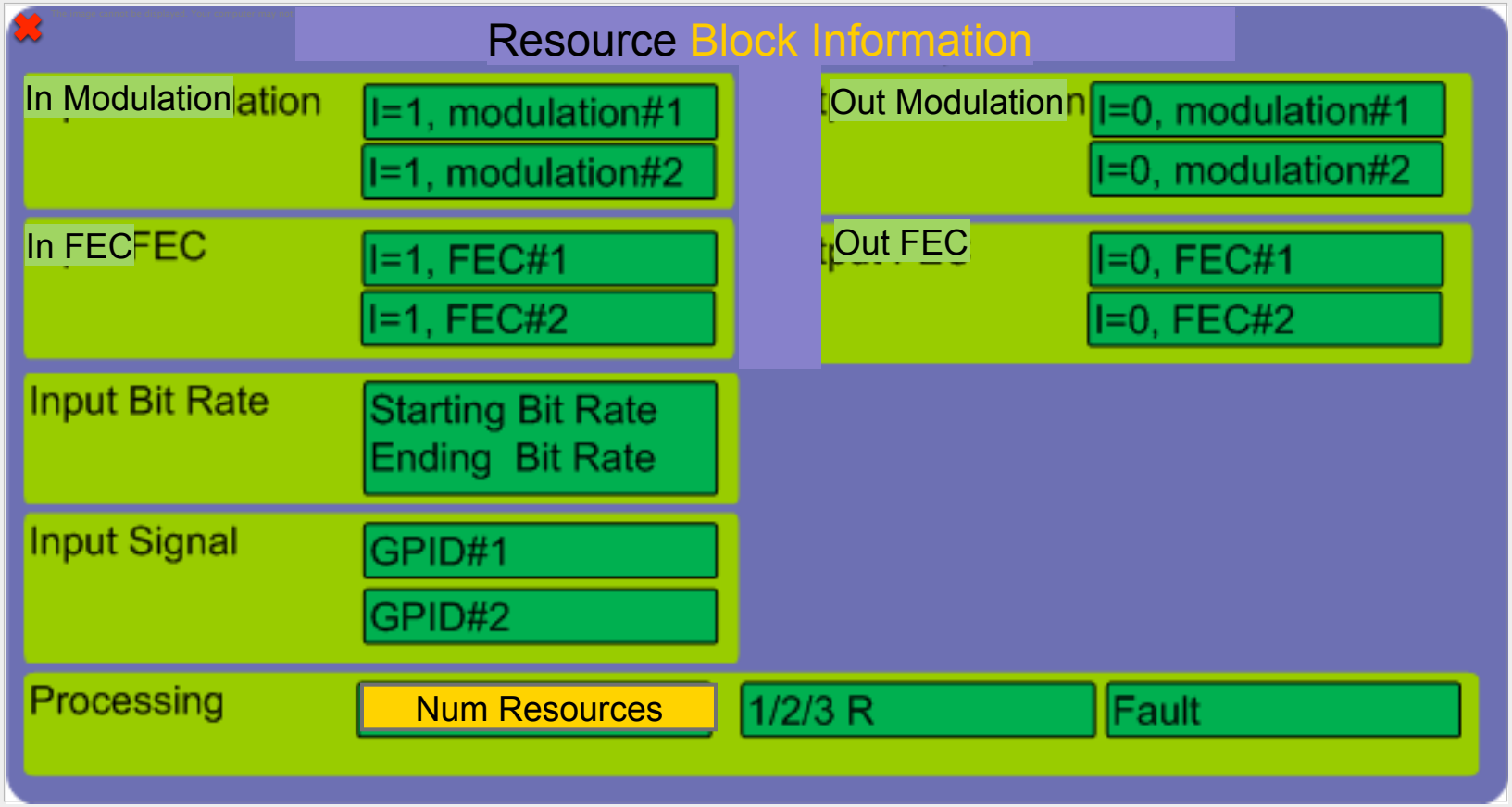
Resource Block information contains :
OEO Properties (Modulation, FEC, BitRate, ClientSignal, Regeneration, FaultMonitoring)

Resource Block specific property : NumResources
Proposal: associate the number of resource to the resource block state

Modification 3 – Enhance Resource Block strength

Enhance Resource Block strength

Current draft describe the properties of Resource Blocks by associating RB IDs to Resource Block Information.



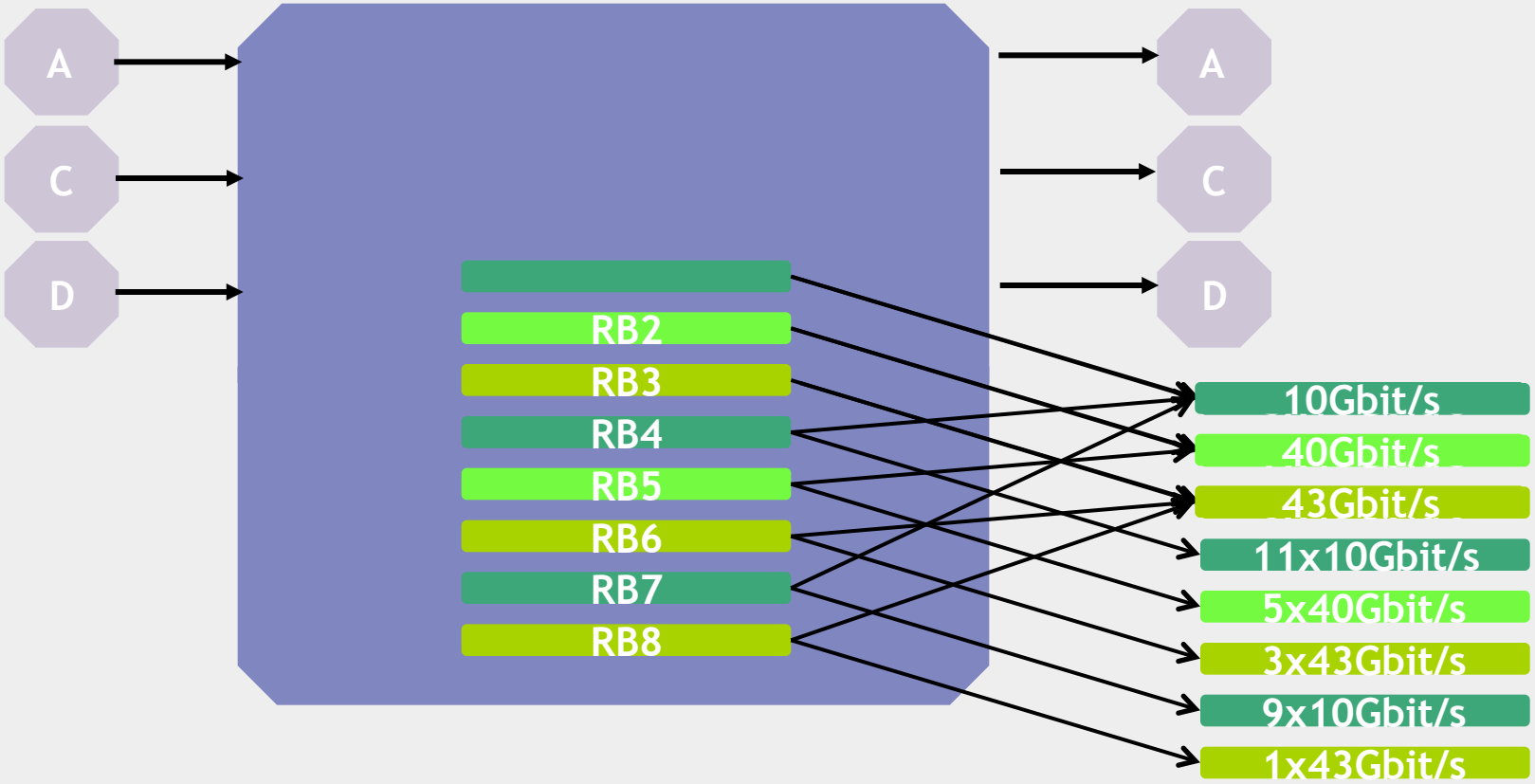
Modification 3 – Enhance Resource Block strength
Detailed view of change

Current draft describe the composition of Resource Blocks by associating IDs to Resource Block Information.

- Having the number of device elsewhere allow better aggregation on that static part (The information is then describing the resources properties)
- In addition we propose one Sub-Sub-TLV modulation instead of one for Ingress modulation and one for egress modulation. This modulation Sub-Sub-TLV, contains a list of ingress or egress modulation, as the modulation already carry an Ingress flag.
- Same reasoning for FEC.
- Same reasoning for wavelength constraints in general

Modification 3 – Example Enhance Resource Block strength

Current WG draft ----> draft-peloso



Modification 3 – Enhance Resource Block strength Pro and cons

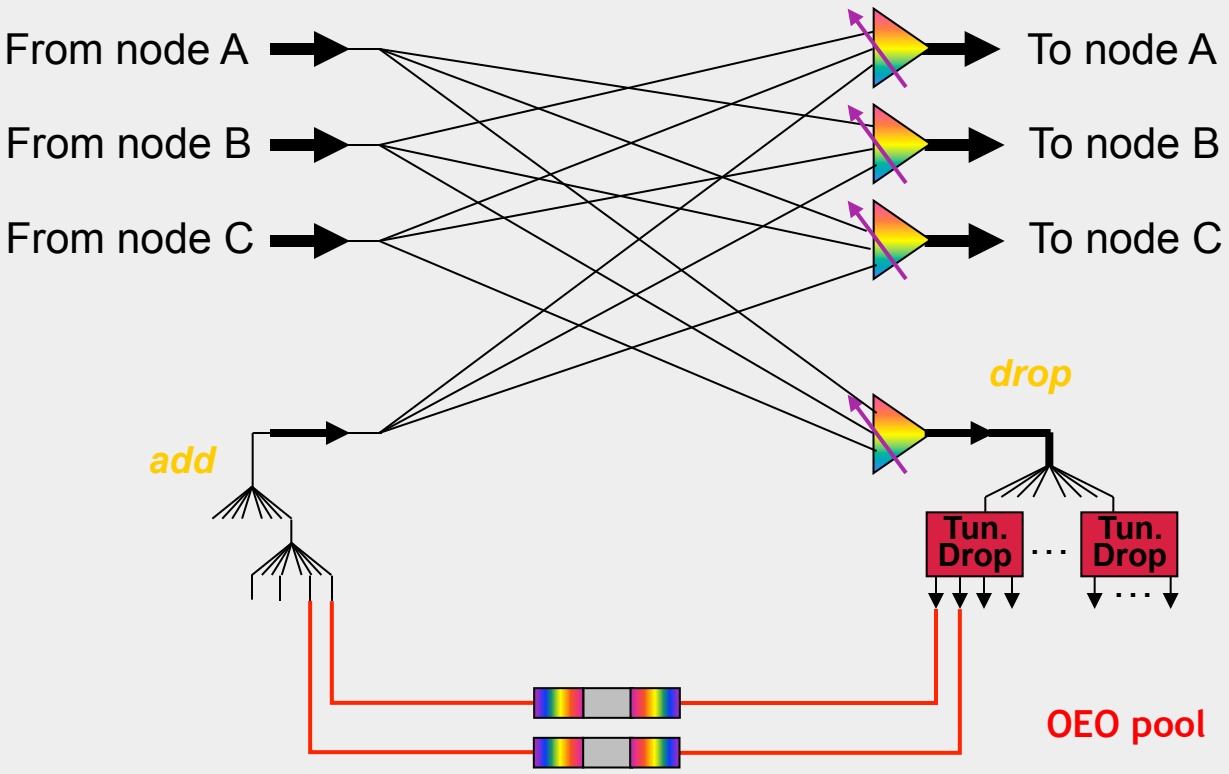
Pros:

- One resource description apply to more resource blocks : better aggregation, more compact encoding.
- Have less sub-sub-TLVs
- Number of resources is part of the Resource Block State?

Cons:

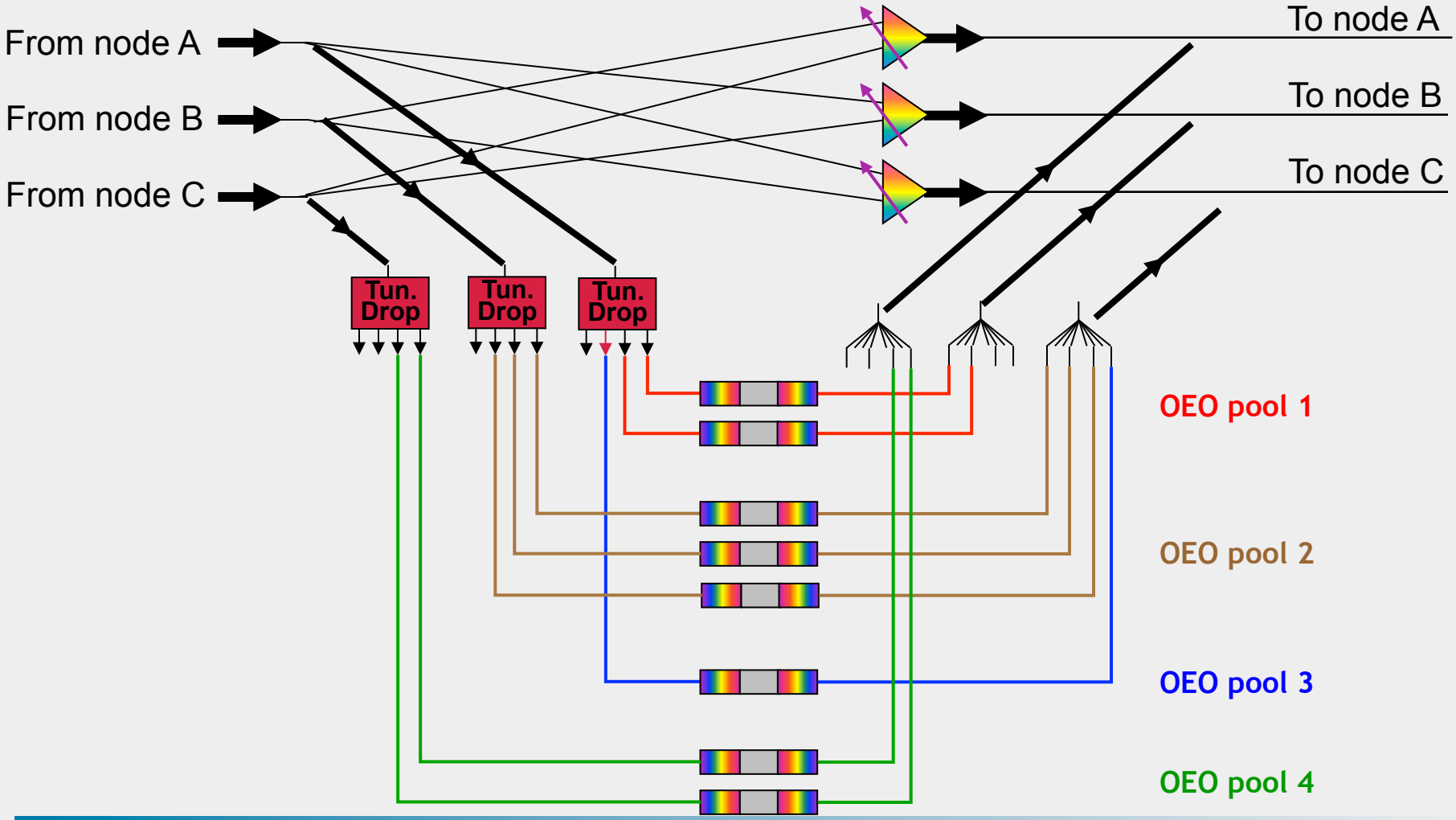
- Number of resources is part of the Resource Block State?

Questions, discussions and adoptions of changes?

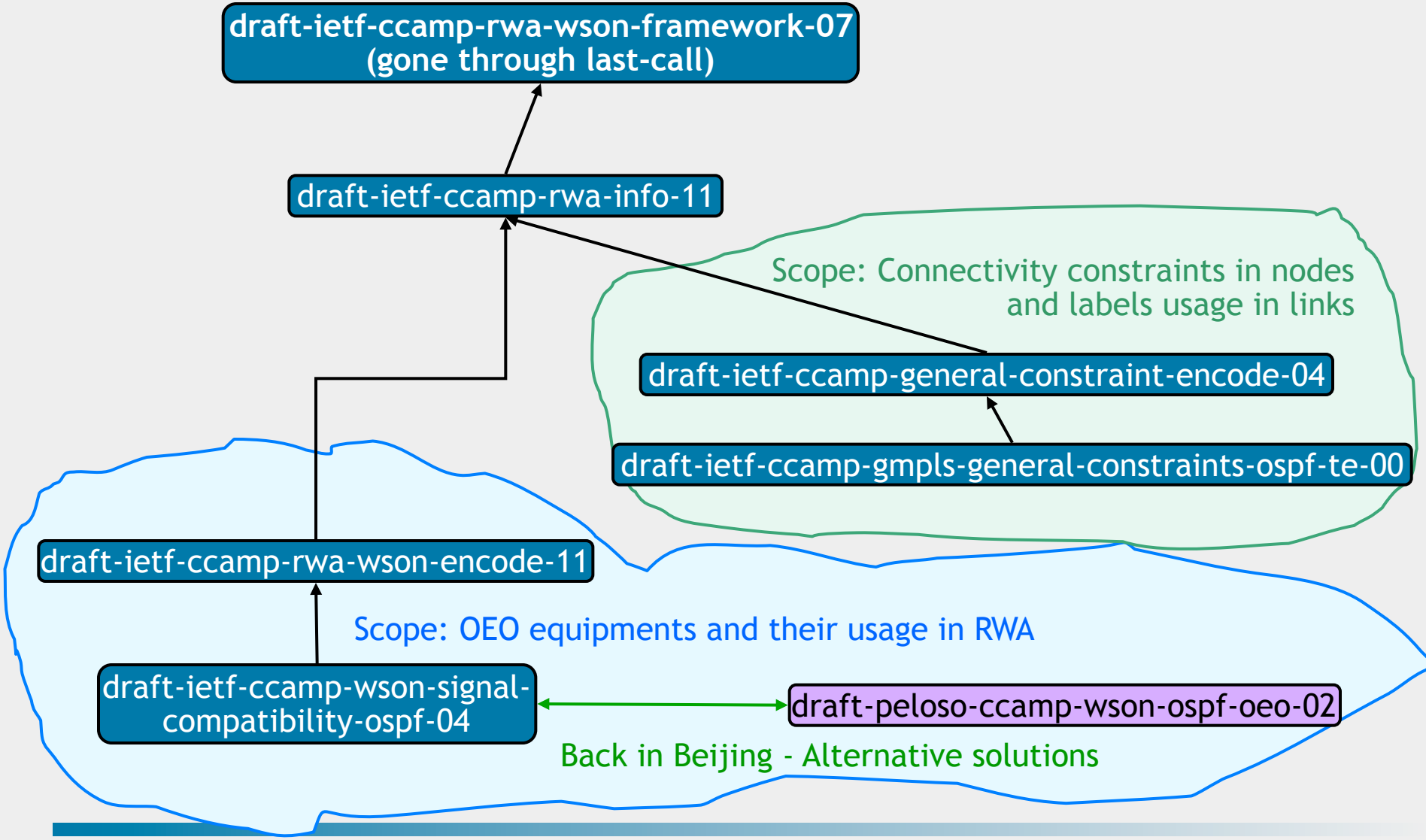


With higher degree nodes (e.g. connectivity = 8):

Multiple pools are really likely to appear (depends on add-drop traffic)


From node A
From node B
From node C
To node A
To node B
To node C
Tun. Drop
Tun. Drop
Tun. Drop
OEO pool 1
OEO pool 2
OEO pool 3
OEO pool 4

Documents context



Modification 3 – Enhance Resource Block strength

Currently RWA model defines “Resource Block Description” (OEO properties)

same OEO features

same number of device *(ref to draft-ietf-ccamp-rwa-info)*