Requirement and protocol for WSON and non-WSON interoperability

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draft-shimazaki-ccamp-wson-interoperability-00

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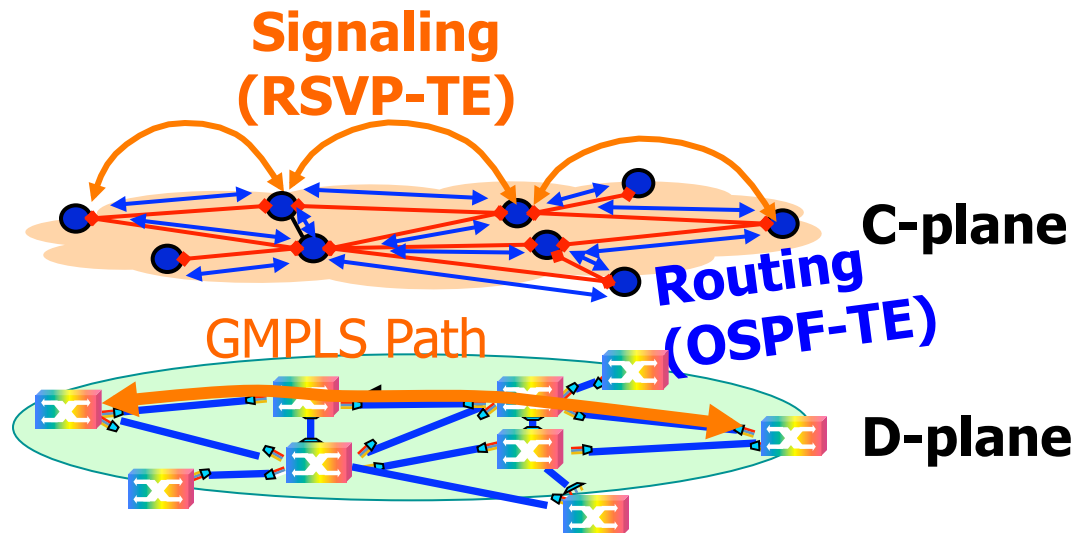
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outline

- Interoperability problem

- Requirements

- Protocol

- Operation example

Interoperability problem –GMPLS case -

- Control plane has been extended for various kinds of techniques.

- New objects/TLVs are continuously defined.

  ➔ Interoperability among nodes becomes difficult.

- λ information (bit map, lambda label) ·
  - PCE function (RWA…)
  - WSON nodes

➔ Advertise, relay, and compute with
  - Non WSON nodes λ information.

➔ Non WSON nodes
  ➔ Need not understand λ information automatically?
  ➔ How to interoperate these nodes automatically?

- How to interoperate these nodes automatically?

λ = 1550 nm !

SRC

RSVP PATH

DST

RSVP PATH

λ ???

WSON

WSON node
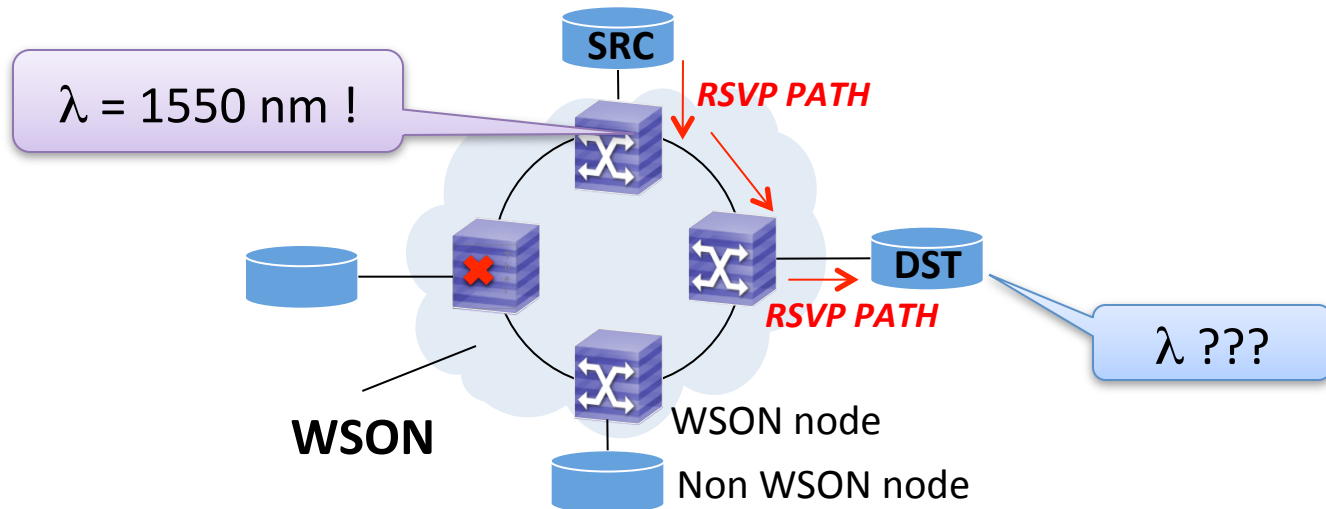
Non WSON node

Requirements(1/2) non-WSON nodes

- Having no impact on interoperating WSON nodes.
  - Need to understand a network topology including WSON domain
  - Need to calculate a route considering WSON topology
 - Need to establish LSP between non-WSON nodes via WSON domain

R1 → O1 → …. → R2

R1 **SRC**

RSVP PATH

O1

R2 **DST**

O2

RSVP PATH

O4

O3

WSON

WSON node
Non WSON node
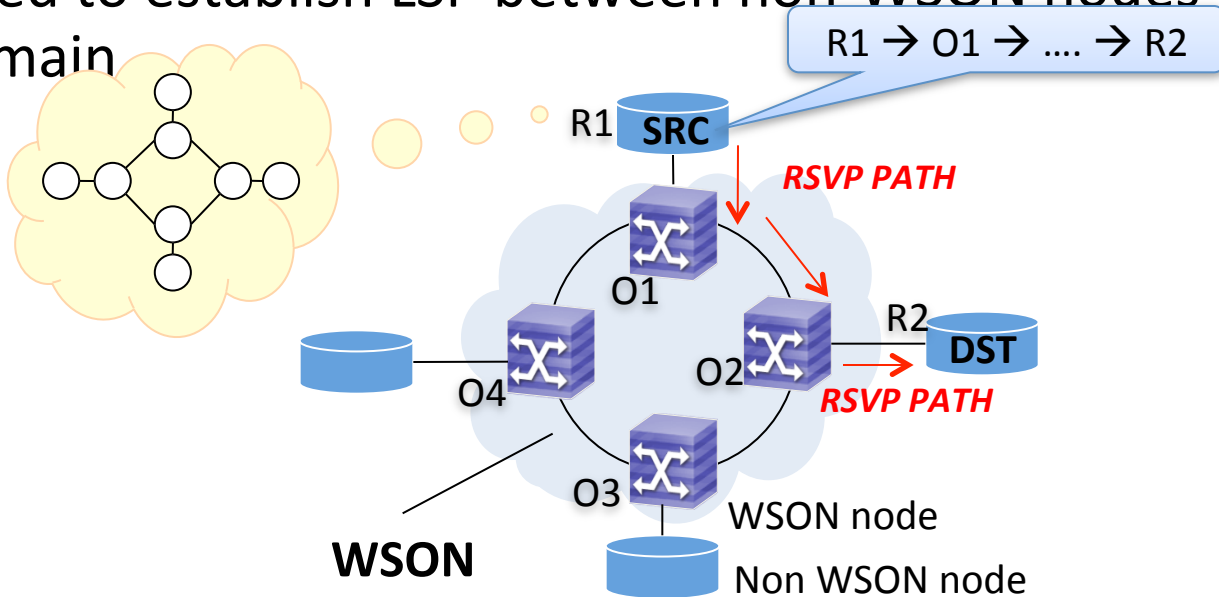
Requirements(2/2) WSON nodes

- ## Handling WSON-extended information.
  - Need to understand a network topology including non-WSON
  - Need to calculate RWA when it is needed
    - Assign available λ
    - Assign a route and available λ
 - Need to establish LSPs
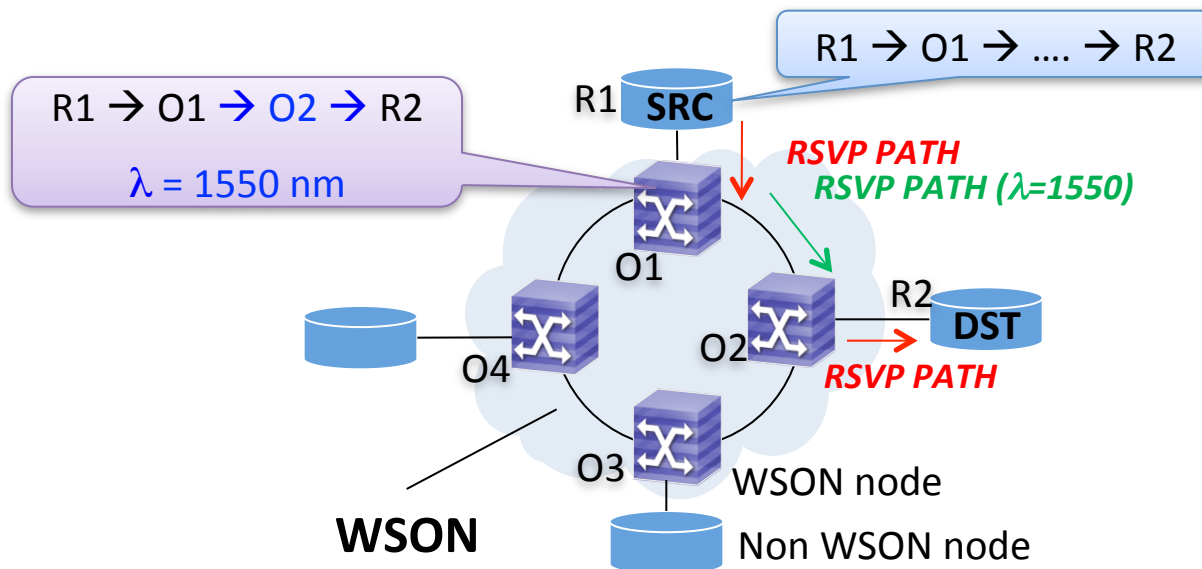
Protocol(1/2)- OSPF-TE

- ## Non-WSON node
  - Advertise TE-link information without λ
  - Ignore λ information in sub-TLV of link information
- ## WSON node
  - Advertise and share available λ information
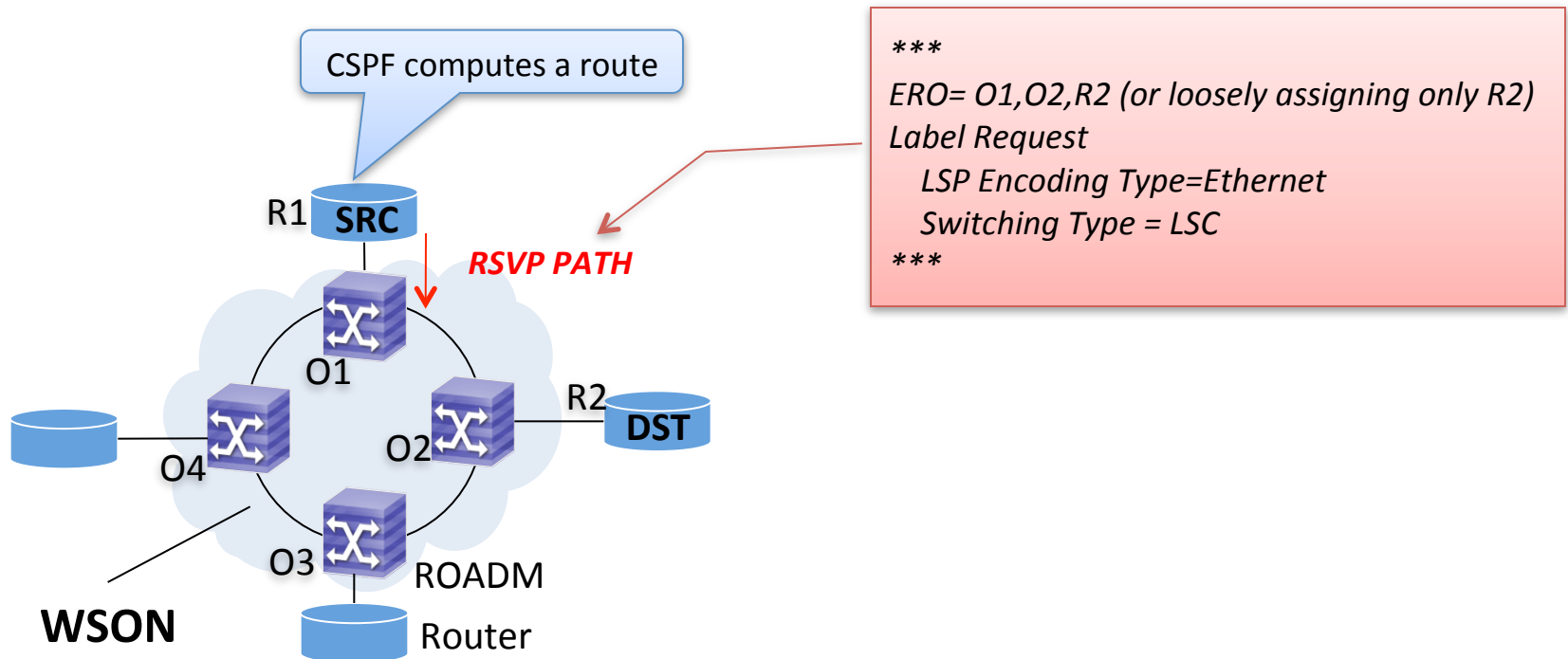 - Understand TE-link in non-WSON topology without λ
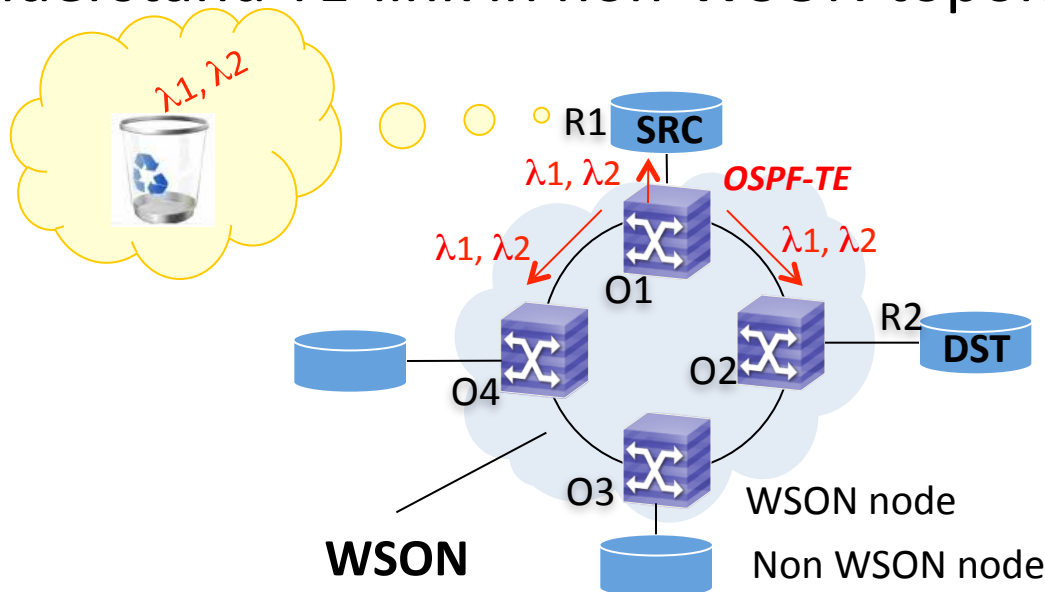
Protocol(2/2)- RSVP-TE

- Non-WSON nodes send RSVP-TE *PATH* message including just a route information.

- WSON nodes
  - add λ information to be used in WSON to RSVP-TE *PATH* message at the ingress of WSON domain
  - Delete λ information from RSVP PATH message at the egress of WSON domain.
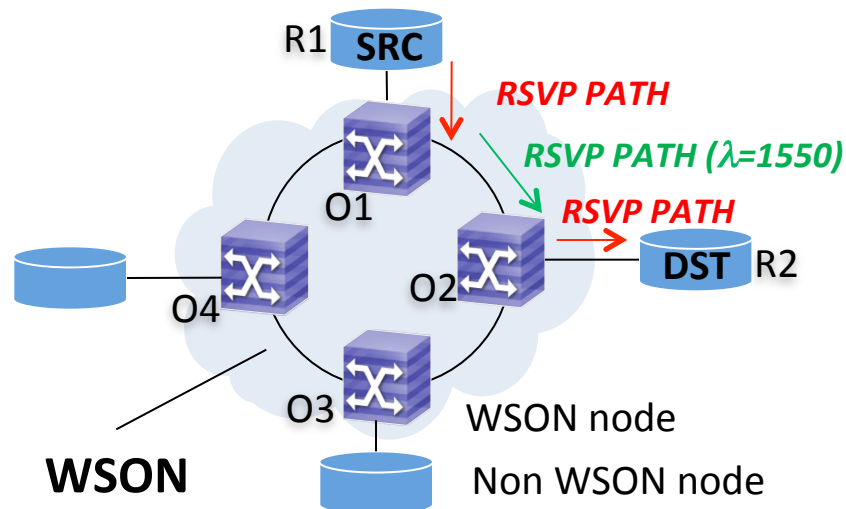
Operation example(1/4)

- **Step 1:**
  - A source router R1 sends RSVP-TE signaling by assigning a path route and switching type as Label Switching Capable (LSC).
    - R1 is assumed to understand a topology in LSC region including all of the routers and ROADMs with OSPF-TE.

CSPF computes a route

```
***
ERO= O1,O2,R2 (or loosely assigning only R2)
Label Request
    LSP Encoding Type=Ethernet
    Switching Type = LSC
***
```

R1 SRC

RSVP PATH

O1

R2 DST

O2

O4

O3   ROADM

**WSON**   Router

Operation example(2/4)

- ***Step 2***:
  - When a ROADM O1 receives the signaling message from R1, its RWA computes a route and one of available λs.
  - O1 then sends the signaling messages which assigns explicit route object (ERO) and λ label to the next node.

RWA algorithm computes both λ and route

R1 **SRC**

RSVP PATH

RSVP PATH (1550)

O1

R2 **DST**

O2

O4

O3 **ROADM**

WSON Router

```
***
ERO= O1,O2,R2 (or loosely assigning only R2)
Label Request
    LSP Encoding Type=Ethernet
    Switching Type = LSC
***
```

```
***
ERO=O2,R2
Label Request
    LSP Encoding Type=Ethernet
    Switching Type = LSC
λ= 1550.0nm
***
```
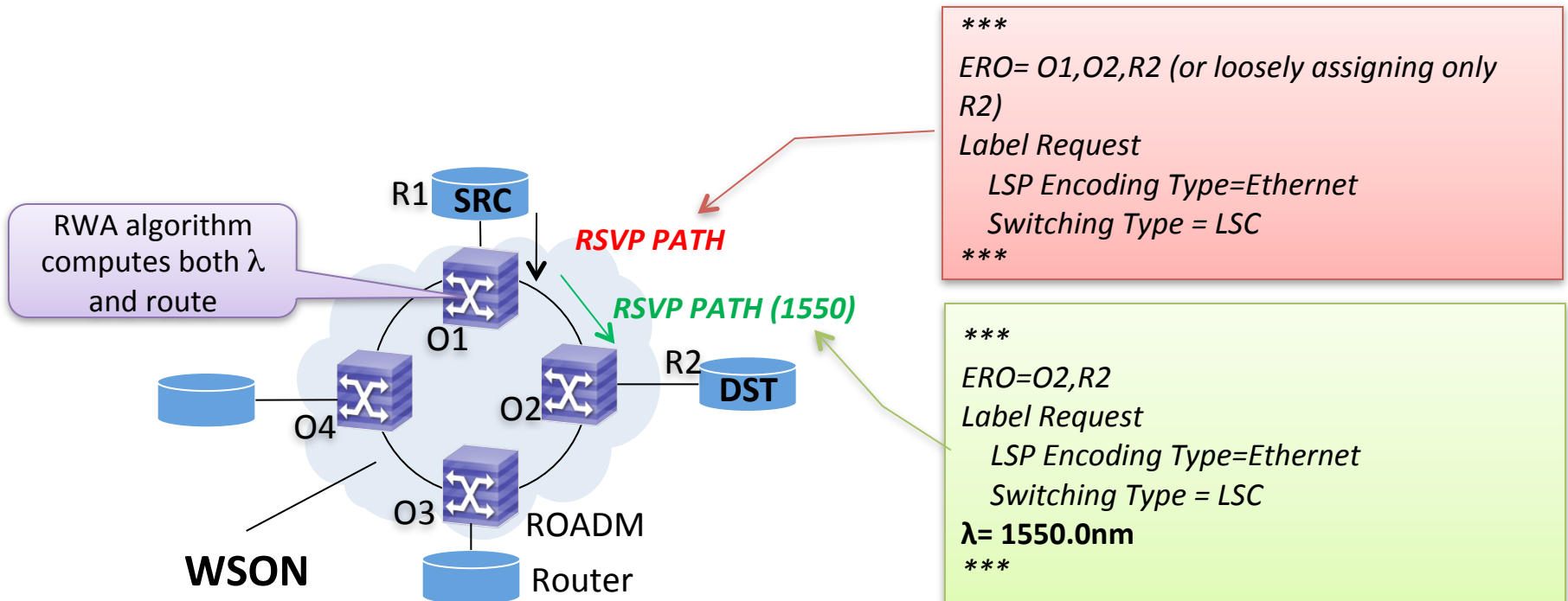
Operation example(3/4)

- *Step 3*:
  - When a ROADM O2 receives the signaling message from O2, it takes its ERO from the signaling messages and sends it to a router R2. (= normal signaling process)
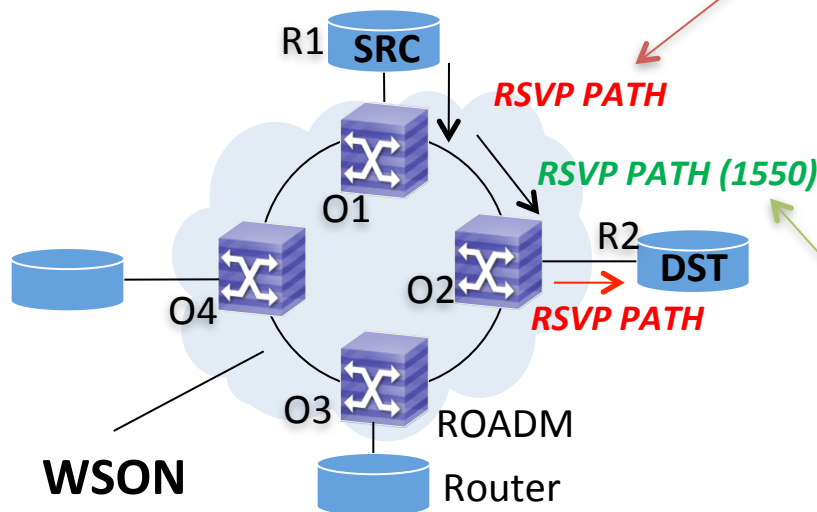


```
***
ERO= O1,O2,R2 (or loosely assigning only
R2)
Label Request
    LSP Encoding Type=Ethernet
    Switching Type = LSC
***
```

```
***
ERO=O2,R2
Label Request
    LSP Encoding Type=Ethernet
    Switching Type = LSC
λ= 1550.0nm
***
```

Operation example(4/4)

- *Step 4*:
  - When R2 receives the signaling messages, it relays replied signaling messages and finally a path is set up along the route.

CSPF computes a route

CSPF computes both λ and route

R1 **SRC**

RSVP PATH

RSVP PATH (1550)

R2 **DST**

O1

O2

RSVP PATH

O4

O3 ROADM

WSON

Router

```
***
ERO= O1,O2,R2 (or loosely assigning only
R2)
Label Request
    LSP Encoding Type=Ethernet
    Switching Type = LSC
***
```

```
***
ERO=O2,R2
Label Request
    LSP Encoding Type=Ethernet
    Switching Type = LSC
λ= 1550.0nm
***
```
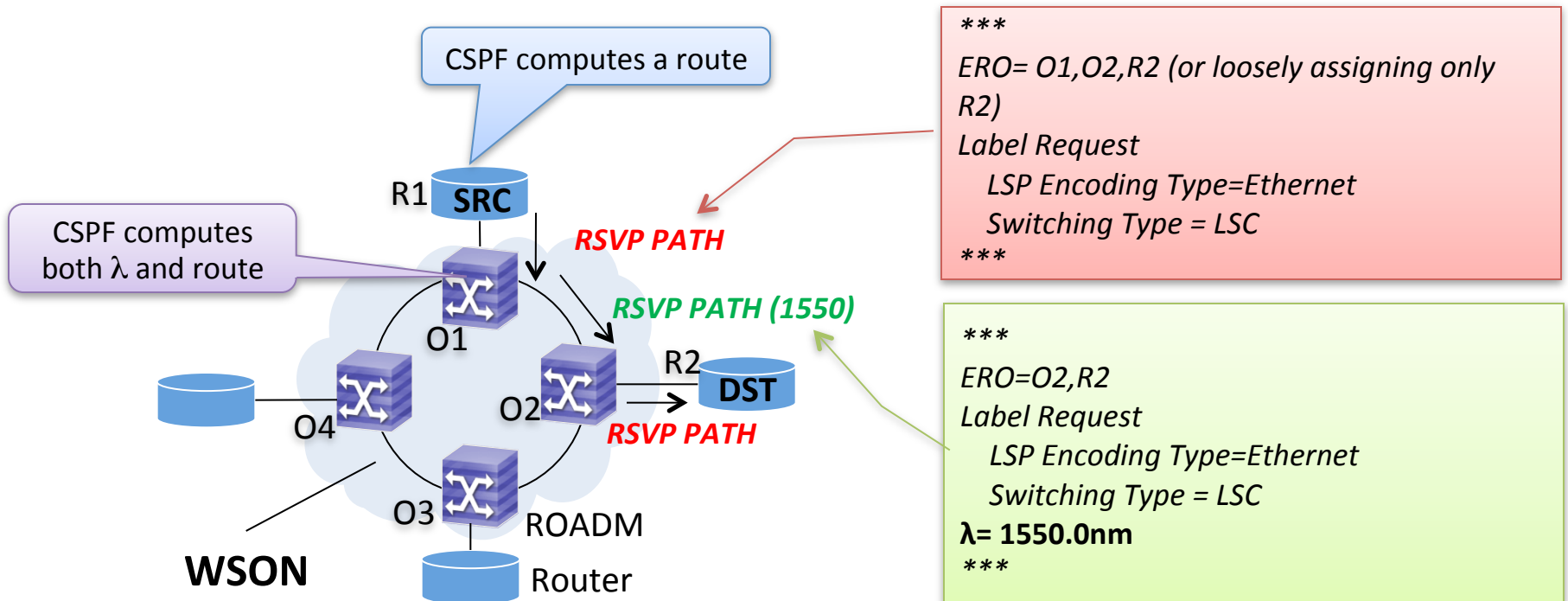
Next Steps

- Refine the document according to the feedback of meeting and mailing list.