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**Working Group:** Architecture

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**TITLE:** A proposal of the Photonic MPLS Network

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**ABSTRACT:**

This contribution proposes the photonic multiprotocol label switching network to construct the photonic IP backbone network. The photonic MPLS network is defined as an optical label switched path (OLSP) based network with MPLS controllers.

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# A proposal of the Photonic MPLS Network

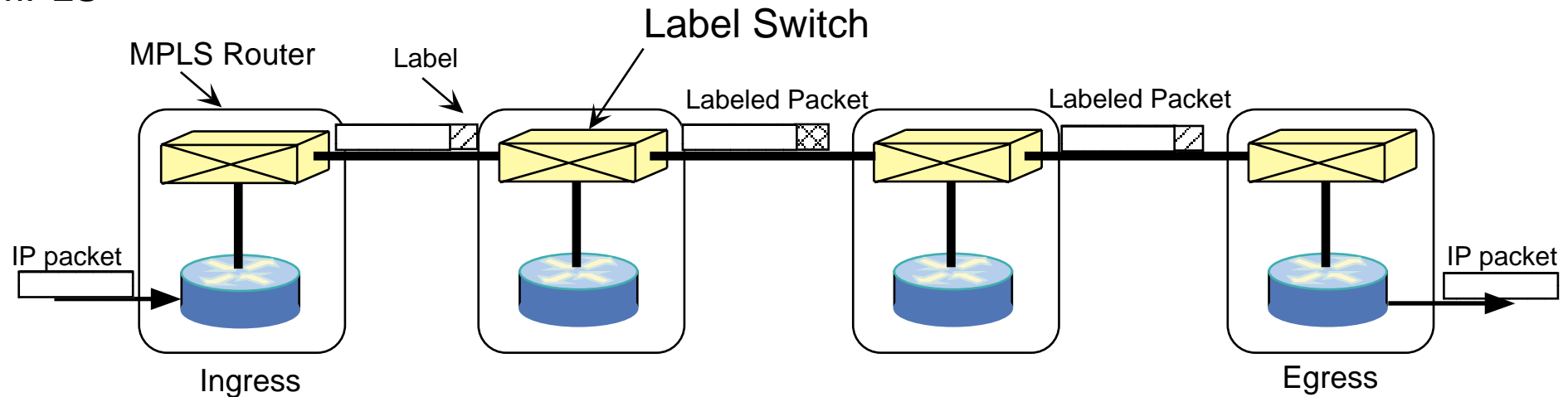
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Network Innovation Laboratories**

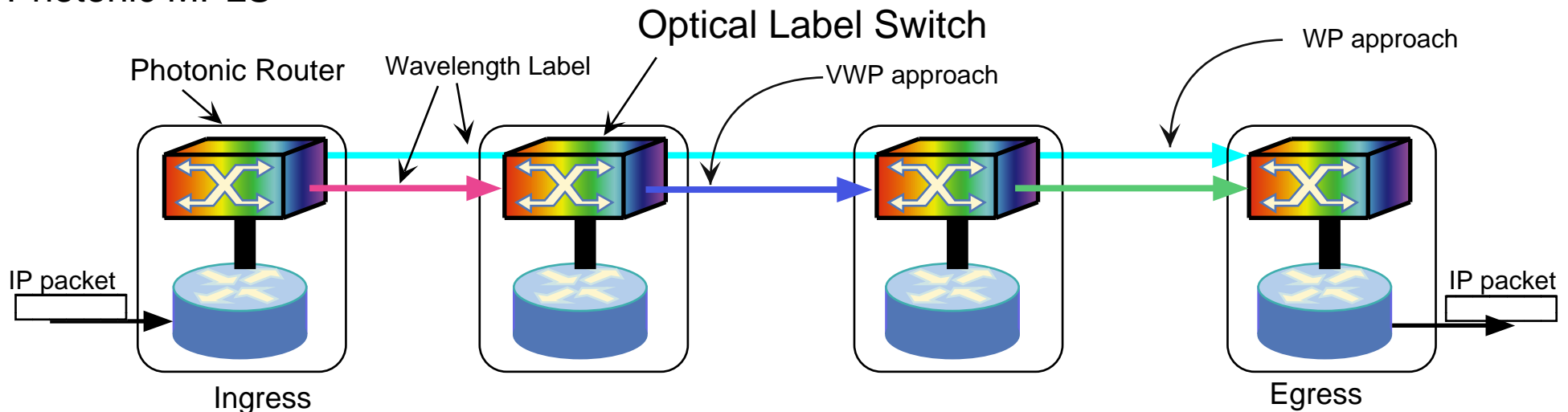
- In 1993, NTT proposed "Wavelength Path (WP)" and "Virtual Wavelength Path (VWP)" concepts.
- WP => no wavelength conversion at intermediate OXCs.  
VWP => wavelength conversion is possible at OXCs.
- Wavelength label is used for layer-1 stream switching.  
WP and VWP provide a label switched path (LSP).
- The standardization of MPLS is progressed in IETF.  
Multi Protocol Lambda Switching is proposed to IETF.
- MPLS control mechanism can be applied to WP and VWP networks.
- Photonic MPLS ~ WP/VWP with MPLS control mechanism.

## MPLS



- Label is added to each **packet**.

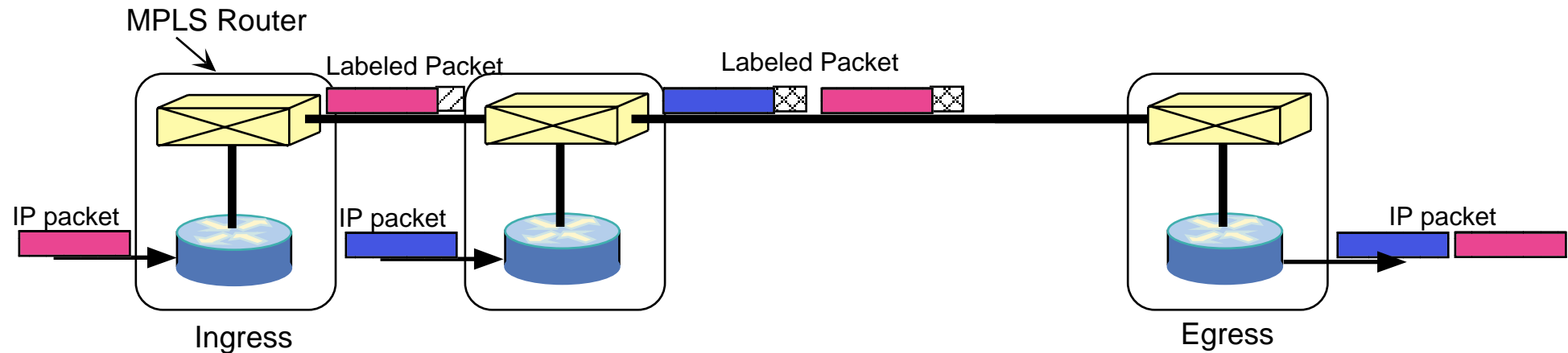
## Photonic MPLS



- Wavelength label is added to each layer 1 **stream**.

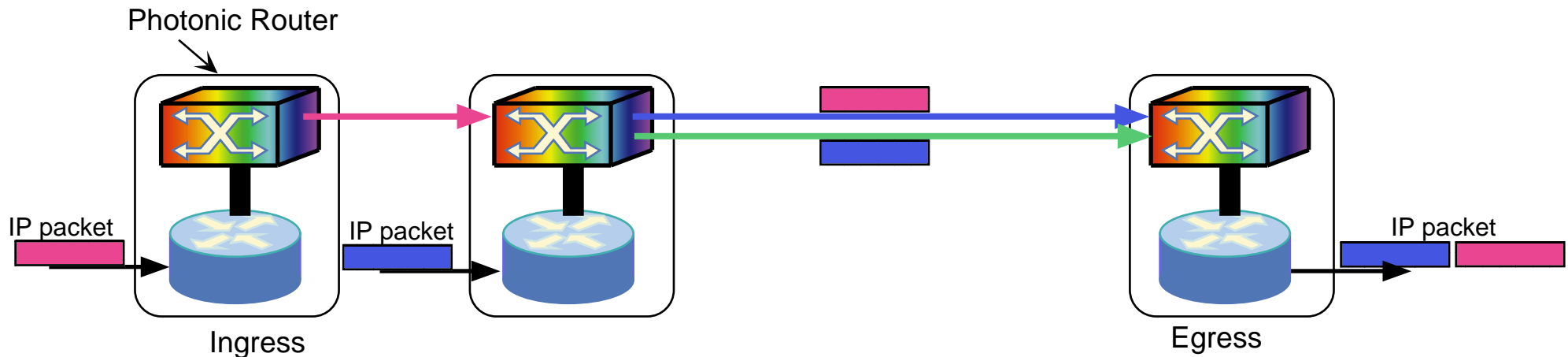
# MPLS and Photonic MPLS Con t.

## MPLS

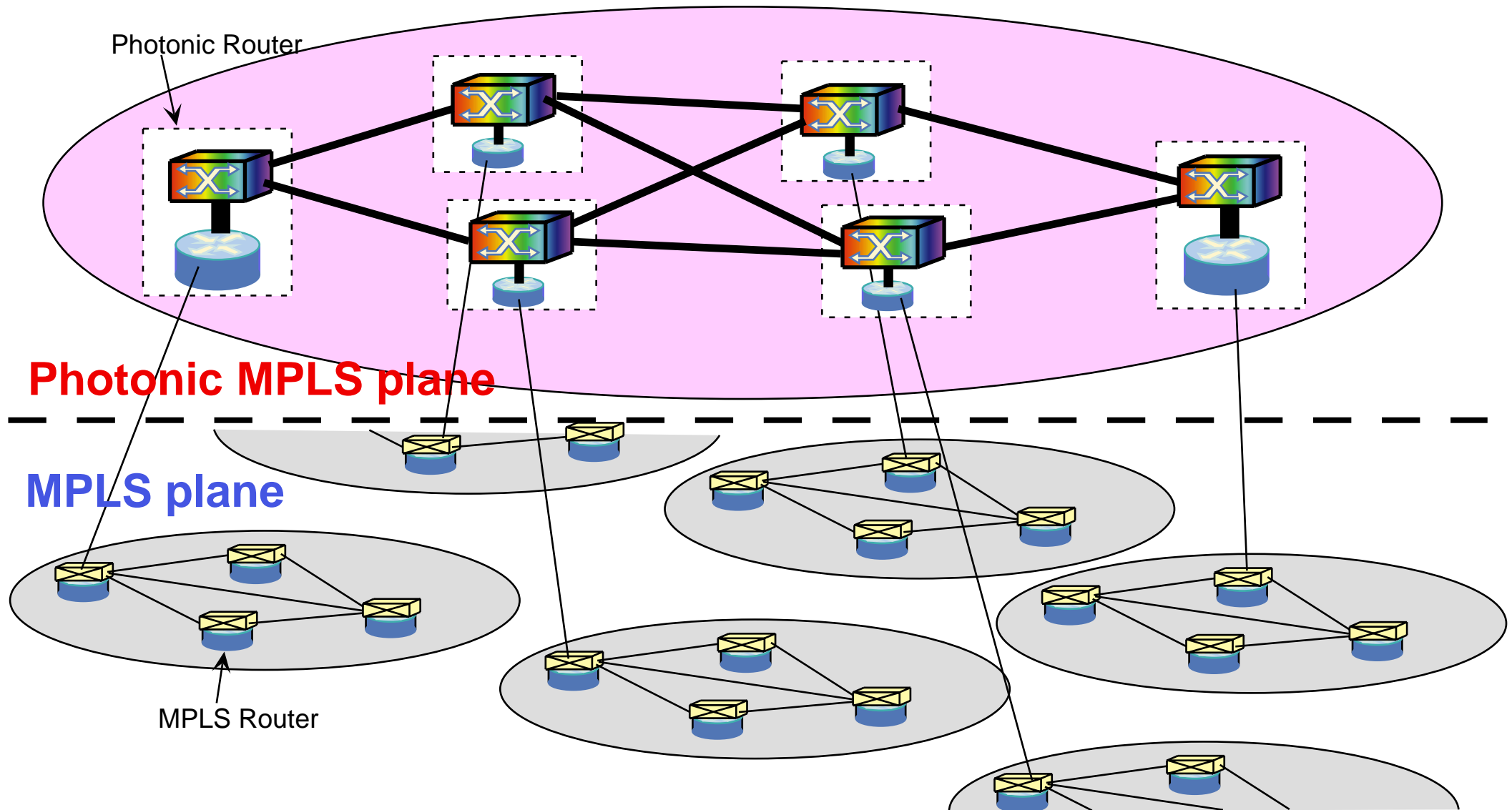


- Label merge function can be realized.

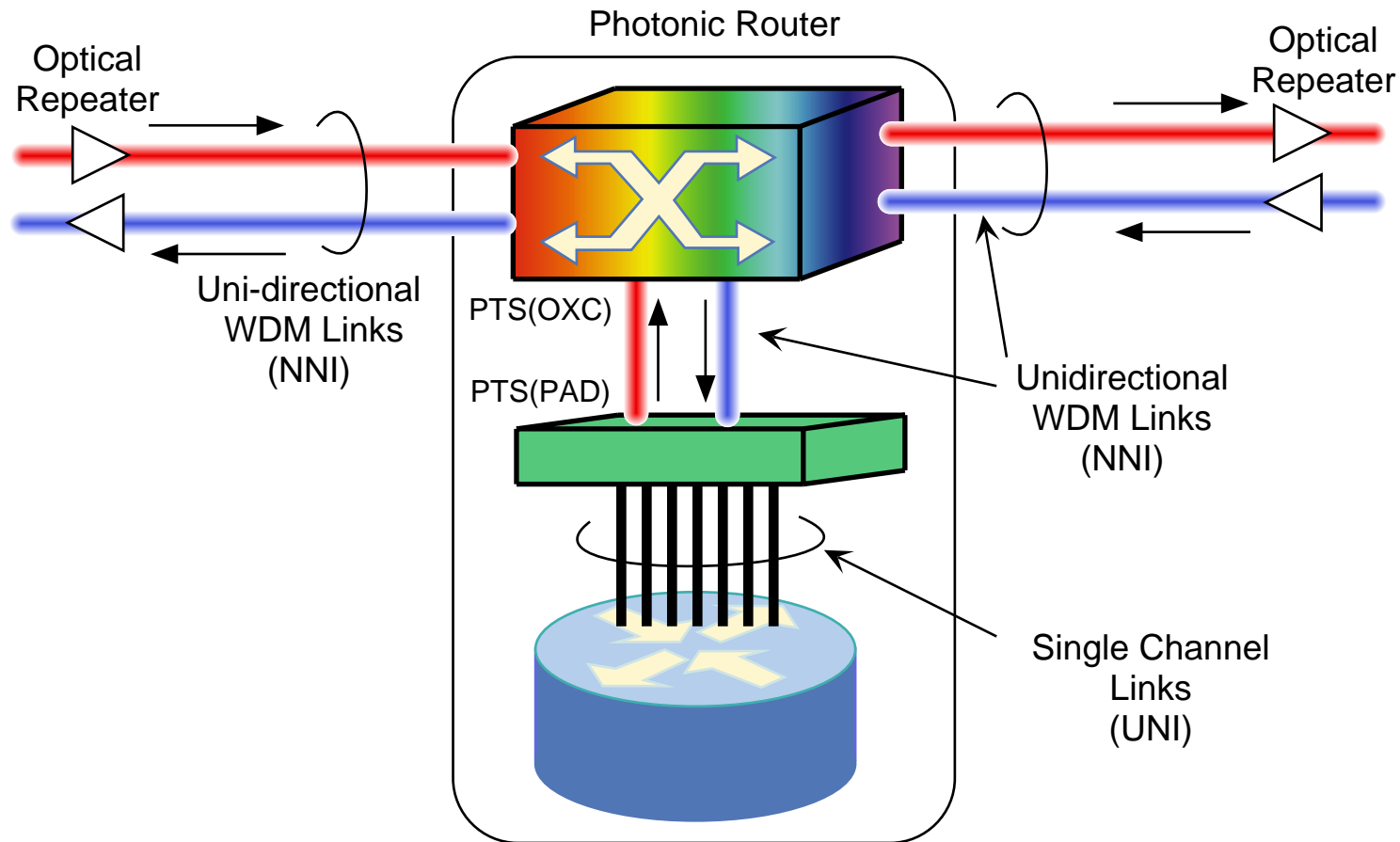
## Photonic MPLS



- Label merge is difficult. Label stack is also difficult.



# Photonic Router Logical Configuration



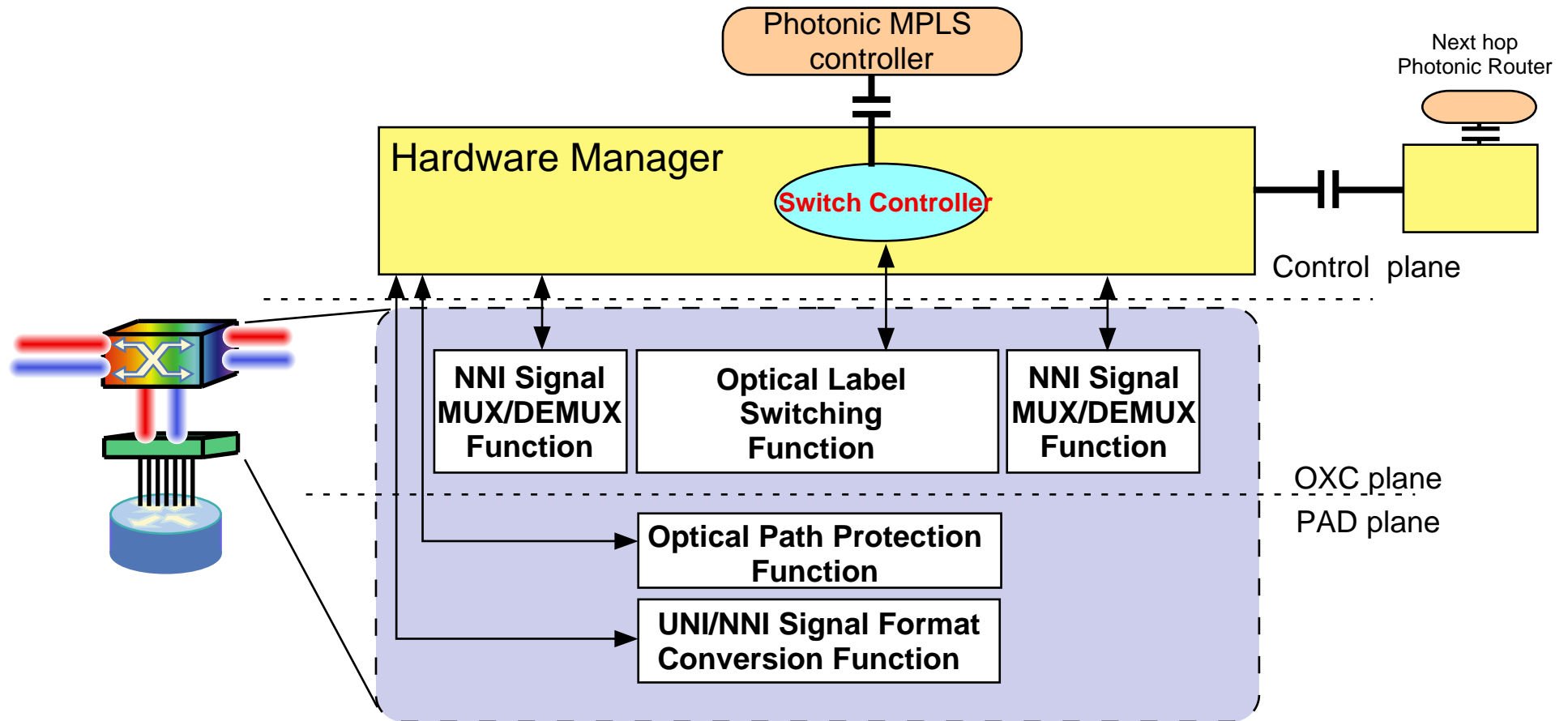
NNI : Network Node Interface

UNI : User Network Interface

PTS : Photonic Transport System (OXC, OADM, etc.)

PAD : photonic transport Payload Assembler/Disassembler (UNI from/to NNI converter)

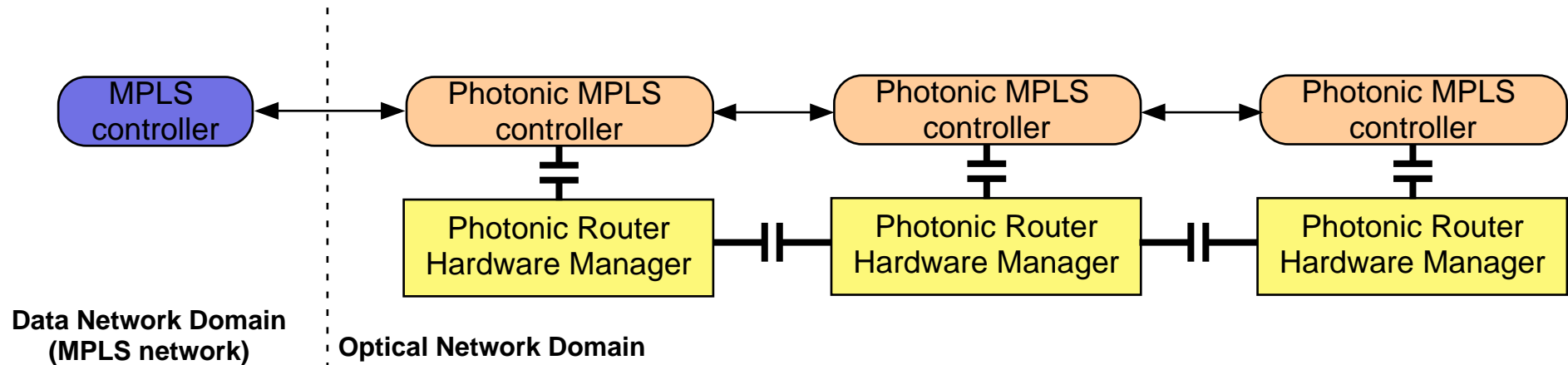
# Photonic Router General Functional View



- Implementation of the optical label switching function is varied with the switch architecture (ex. electronic switch, all optical switch, and both combined).
- Other switch control software (ex. TMN based network operation system) can be applied.



# Standardization Issues



- Signalling channel between photonic router hardware managers will be standardized at ITU-T. It may be provided by an optical supervisory channel (OMS/OTS overhead channel).
- Signalling IF between the photonic MPLS controller and the photonic router hardware manager should be standardized.
- Signalling IF between photonic MPLS controllers should be standardized.
- Signalling IF between the MPLS controller and the photonic MPLS controller should be standardized.

- The wavelength path (WP) and the virtual wavelength path (VWP) provide some kinds of the label switched path.  
=> "The optical label switched path : OLSP"
- To realize the fast OLSP provisioning, applying existing MPLS control mechanism to OLSP is a realistic solution.  
=> "Photonic MPLS"
- Motion : Add a photonic MPLS architecture and signalling method as a work item.