WSON Routing WG Drafts

1. Routing and Wavelength Assignment Information Model for WSON
2. General Network Element Constraint Encoding for GMPLS Controlled
3. Routing and Wavelength Assignment Information Encoding for WSON
4. OSPF Enhancement for Signal and Network Element Compatibility for WSON

Authors/Contributors

- **Greg Bernstein** (Grotto Networking)
- Diego Caviglia (Ericsson)
- Ander Gavler (Acreo AB)
- **Young Lee** (Huawei)
- **Dan Li** (Huawei)
- **Wataru Imajuku** (NTT)
- Jonas Martensson (Acreo AB)
- Itaru Nishioka (NEC Corp.)
- Jianrui (Rebecca) Han (Huawei)

Routing and Wavelength Assignment **Information Model** for Wavelength Switched Optical Networks

draft-ietf-ccamp-wson-info-11.txt

- Changes from 09 and 10 (Editorial only)
- Section 5: *clarified* the way that the resource pool is modeled from blocks of identical resources.
- Section 5.1: *grammar* fixes. *Removed* reference to "academic" modeling pre-print. Clarified RBNF resource pool model details.
- Section 5.2: *Formatting* fixes.
- Enhanced the *explanation* of shared fiber access to resources and updated Figure 2 to show a more general situation to be modeled.
- Removed all 1st person idioms.

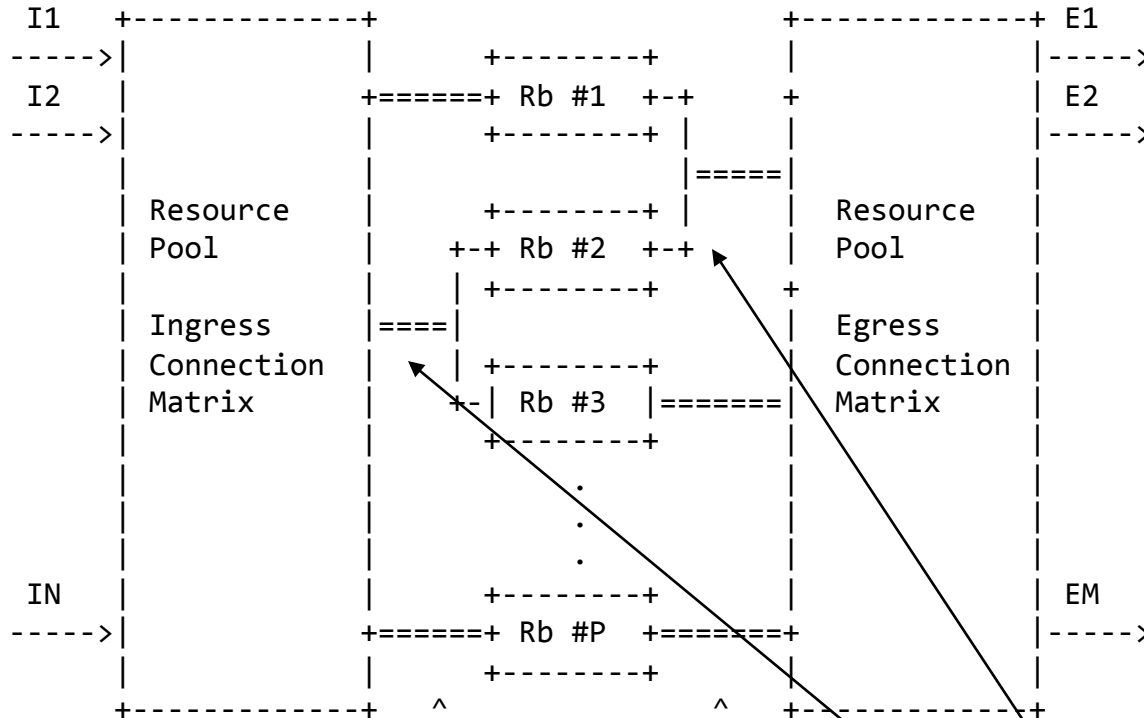# Resources, Blocks, Sets and Pools
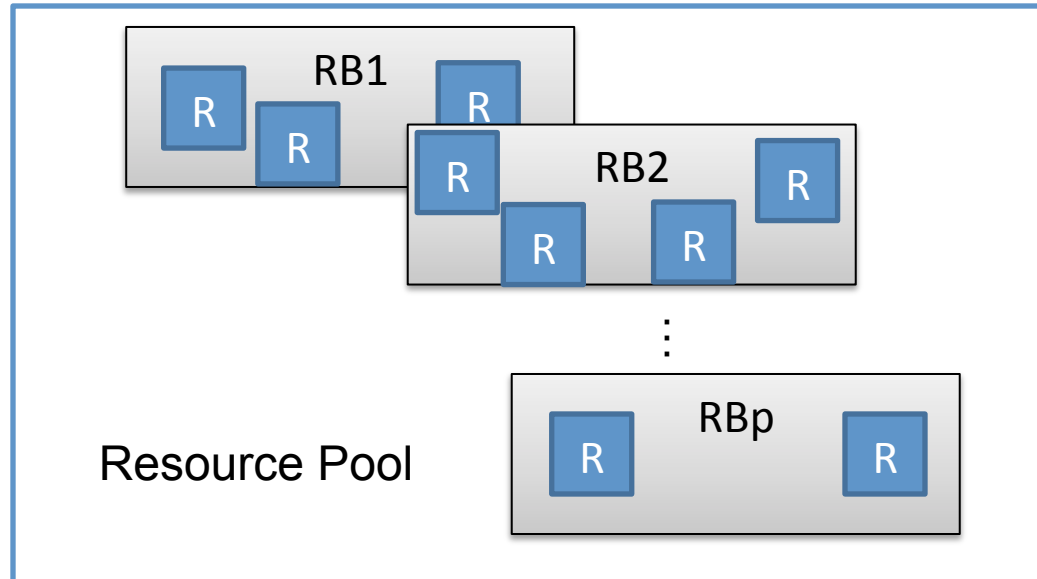
R = resource
RB = resource block

Resource Pool

RB1

RB2

RBp

:

Resource sets:
(RB1, RB2),
(RB2, RB3, RB4),
Etc…

- Simple hierarchy:
  - The **resource pool** is partitioned into **resource blocks** containing individual **resources**.

- Efficient and general encoding:
  - Resources blocks are combined into **sets** for encoding of common properties.

Enhanced Shared Fiber Pool Example

```
 I1   +-------------+                              +-------------+ E1
----->|             |       +--------+             |             |----->
 I2   |             |       +======+ Rb #1  +-+    +             | E2
----->|             |       +--------+ |     |             |----->
      |             |                 |=====|     |             |
      | Resource    |       +--------+ |     | Resource    |
      | Pool        |       +-+ Rb #2  +-+   | Pool        |
      |             |       | +--------+     +             |
      | Ingress     |====|  |                |  | Egress      |
      | Connection  |  |  |  +--------+      | Connection  |
      | Matrix      |  +-| Rb #3  |=======|  | Matrix      |
      |             |     +--------+          |             |
      |             |            .            |             |
      |             |            .            |             |
      |             |            .            |             |
 IN   |             |       +--------+        |             | EM
----->|             |       +======+ Rb #P  +=======+       |----->
      |             |       +--------+          |             |
      +-------------+        ^        ^        +-------------+
                            |        |
                            |        |
                            |        |
             Single (shared) fibers for block ingress and egress

             Ingress wavelength          Egress wavelength
             availability for            availability for
             each block ingress fiber  each block egress fiber
```

Section 5.1
Figure 2
Resource pools
with shared fiber
access

Model supports
general shared fiber
access to blocks
within pool

General Network Element Constraint **Encoding** for GMPLS Controlled Networks

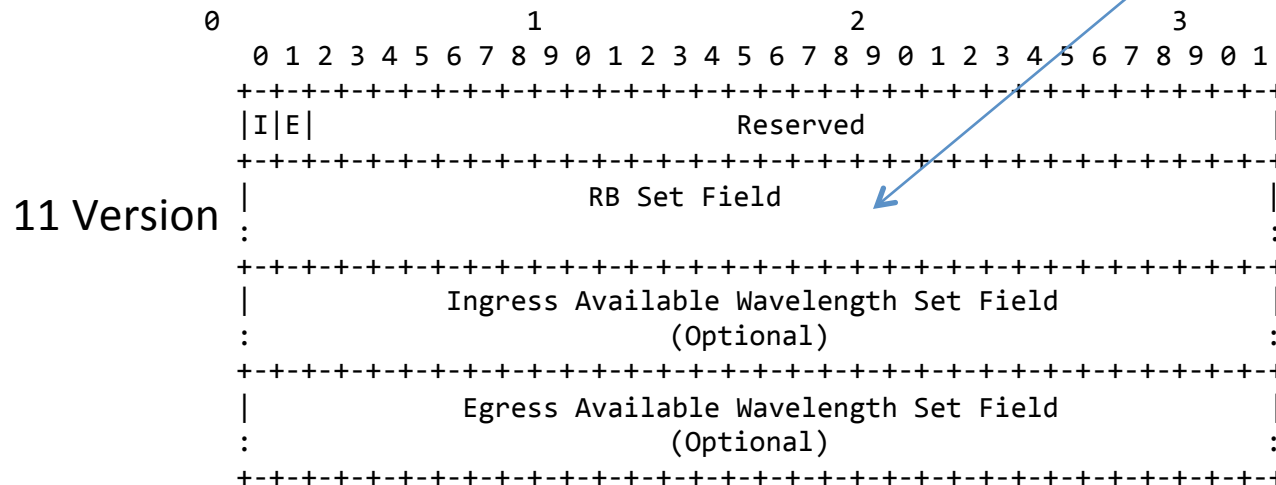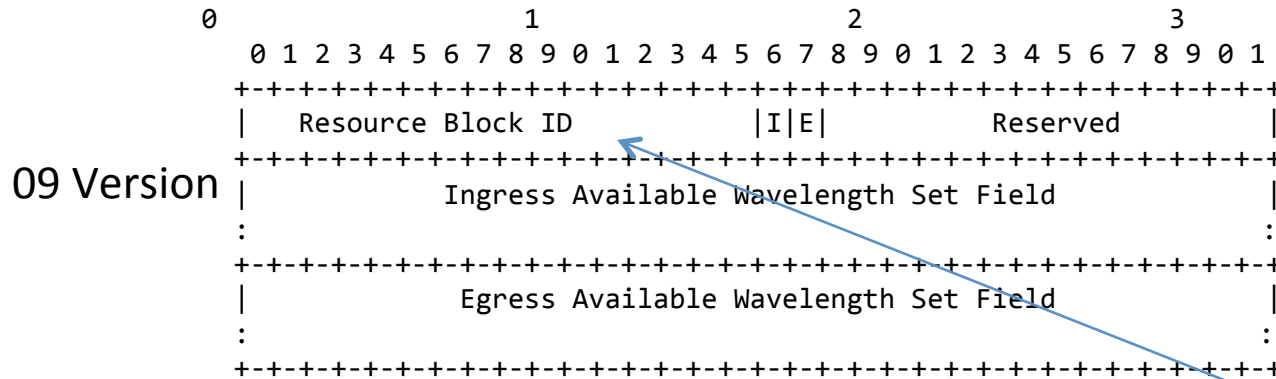**draft-ietf-ccamp-general-constraint-encode-04.txt**

- Changes from 03 version:
  - Removed informational BNF from section
  - Removed section on "Extension Encoding Usage Recommendations"
- No coding or technical changes.

Routing and Wavelength Assignment Information **Encoding** for Wavelength Switched Optical Networks

draft-ietf-ccamp-rwa-wson-encode-11.txt

- Section 3: Enhanced text to clarify relationship between pools, blocks and resources.
- Section 4: Deleted reference to previously removed RBNF element. Fixed TLV figures and descriptions for consistent sub-sub-TLV nomenclature.
- Fixed ordering of fields in second half of sub-TLV example in Appendix A.1.
- Clarifying edits in section 3 on pools, blocks, and resources.
- *Fixed the "Block Shared Access Wavelength Availability sub-TLV" of section 3.4 to use an "RB set field" rather than a single RB ID.* (only coding change)
- Removed remaining 1st person idioms. Updated IANA section.

Coding Change

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Resource Block ID         |I|E|          Reserved        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            Ingress Available Wavelength Set Field             |
:                                                               :
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             Egress Available Wavelength Set Field             |
:                                                               :
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

09 Version

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|I|E|                     Reserved                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       RB Set Field                           |
:                                                               :
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            Ingress Available Wavelength Set Field             |
:                         (Optional)                           :
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             Egress Available Wavelength Set Field            |
:                         (Optional)                           :
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

11 Version

Small change
for consistency
with other TLVs
and generality

OSPF Enhancement for Signal and Network Element Compatibility for Wavelength Switched Optical Networks

draft-ietf-ccamp-wson-signal-compatibility-ospf-04.txt

- From 02 to 03:

  – Create a new top Level TLV , "Optical Node Property" to advertise all WSON resource related LSAs.

- From 03 to 04:

  – Add a new sub-TLV, Block Shared Access Wavelength Availability TLV to be consistent with [RWA-Encode] and editorial changes.

Next Step

Last call

- – All documents stable for some time.
- – All documents consistent with WG decisions concerning partitioning of functionality
- – All feature and functionality requests incorporated
- – Clarifying and explanatory text added as requested