

**YANGster Meeting #29**  
**IEEE 802 Plenary Meeting**  
**Waikoloa Hawaii, USA**  
**November 2019**

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# Agenda Meeting #29

- | IPR Call
- | Ethernets PAR/CSD (Glenn Parsons)
- | Units (Stephen Bush)
- | Meta-Data (Mark Ellison)
- | Discussion on Constraint Checking in YANG (Don Fedyk)
- | More YANGsters calls motion in Hawaii
- | AoB

# EtherTypes PAR/CSD

## Comments from Bob Grow

### PAR

- 5.2.b (project scope) — The first sentence is awkward and could be parsed inaccurately. Propose rewrite from: "This amendment specifies a procedure to generate YANG modules that contain the full EtherType information, including a compact human-readable name, found in the IEEE Registration Authority EtherType public listing.", to: "This amendment specifies a procedure to generate YANG modules that contain full EtherType identified protocol information (typically as found in the IEEE Registration Authority EtherType public listing), and adds a compact human-readable name (not found in the EtherType public listing)."
- 5.2.b (project scope) — The second sentence is ambiguous, are the errors and omissions in the EtherType public listing or in Std 802? Assuming this is a catch all for maintenance items on Std 802, it should clearly state that is the case. Possibly: "This amendment also addresses errors and omissions in IEEE Std 802 descriptions of existing functionality."
- 5.2.b (project scope) — Assuming the second sentence allows maintenance tasks to be performed, the group may want to include in those maintenance changes making Std 802 consistent in its capitalization of EtherType. While EtherType is dominant in Std 802, the existing standard also uses Ethertype. Other 802.1 standards predominantly use Ethertype. Certainly only one capitalization should be used in any given standard, but it would also be nice if 802.1 picked one for gradual enforcement as its standards are revised. No change to the PAR is requested.
- 5.5 (need) — This description doesn't clearly record rationale in discussion leading up to proposing this PAR. One important omission is that the IEEE RA listing may be misleading because assignees have not updated the information provided on their application for the EtherType. A standards project is the most efficient way to create an accurate listing of the common names within the industry for the protocols identified by a particular EtherType.
- 6.1.b (registration activity) — The project being dependent on enhancement of the EtherType public listing is not practical. It is unlikely that the public listing would be enhanced with common names unless such information can reference a standard for the common name (otherwise, update is dependent on the assignee providing the common name, something not likely to happen as desired).

### CSD

- 1.1.1 (Managed objects) — The response is somewhat inaccurate. "This project is primarily a management project providing a YANG data model that contains compact human-readable names for the EtherType information found in the IEEE Registration Authority EtherType public listing." Would better read "This project is primarily a management project providing a YANG data model that defines compact human-readable names for selected EtherType assignments found in the IEEE Registration Authority EtherType public listing."

## Discussion and way forward

# Units

- | IEEE 1906.1.1 is working on YANG
- | One of the modules they are working on is for Fundamental SI Units
- | The purpose is to create a YANG module that would capture the SI prefixes, SI units, and common non-SI units. Examples on next couple of slides



# SI Prefixes

Factor	Name	Symbol	Factor	Name	Symbol
10	deca	da	1e-1	deci	d
1e2	hecto	h	1e-2	centi	c
1e3	kilo	k	1e-3	milli	m
1e6	mega	M	1e-4	micro	μ
1e9	giga	G	1e-9	nano	n
1e12	tera	T	1e-12	pico	p
1e15	peta	P	1e-15	femto	f
1e16	exa	E	1e-18	atto	a
1e21	zetta	Z	1e-21	zepto	z
1e24	yotta	Y	1e-24	yocto	y

# SI Base and Derived Units

SI BASE AND DERIVED UNITS			
Name	Unit	Name	Unit
absorbed-dose	Gy	luminance	Lv
absorbed-dose-rate	Gy/s	luminous-flux	lm
acceleration	a	luminous-intensity	cd
activity (radionuclide activit.)	Bq	magnetic-field-strength	H
amount-concentration (concentr.)	c	magnetic-flux	Wb
amount-of-substance	mol	magnetic-flux-density	T
angular-acceleration	rad/s <sup>2</sup>	mass	kg
angular-velocity	rad/s	mass-concentration	$\rho, \gamma$
area	A	mass-density	$\rho$
capacitance	F	molar-energy	J/mol
catalytic-activity	katal	molar-heat-capacity (entropy)	J/mol
catalytic-activity-concentration	kat/m <sup>3</sup>	permeability	H/m
current-density	j	permittivity	F/m
dose-equivalent	Sv	plane-angle	rad
dynamic-viscosity	Pa s	power (radiant-flux)	W
electric-charge	C	pressure	Pa
electric-charge-density	C/m <sup>3</sup>	radiance	W/m <sup>2</sup> ..
electric-conductance	S	radiant-intensity	W/sr
electric-current	A	refractive-index	
electric-field-strength	V/m	relative-permeability	
electric-flux-density	C/m <sup>2</sup>	solid-angle	sr
electric-potential-difference	V	specific-energy	J/kg
electric-resistance	Ohm	specific-heat-capacity (sp-entr.)	J/kg.K
energy (work, amount-of-heat)	J	specific-volume	v
energy-density	J/m <sup>3</sup>	surface-charge-density	C/m <sup>2</sup>
exposure (x and Gamma rays)	C/kg	surface-density	$\rho_A$
force	N	surface-tension	N/m
frequency	Hz	temperature	°C
heat-capacity (entropy)	J/K	thermal-conductivity	W/m.K
heat-flux-density (irradiance)	W/m <sup>2</sup>	thermodynamic-temperature	K
illuminance	lx	time (duration)	s
inductance	H	velocity	v
length	m	volume	V
		wavenumber	$\sigma$

# Common Non-SI Units

NON SI UNITS IN SI BROCHURE			
Name	Unit	Name	Unit
acceleration-due-to-gravity	Gal	hartree-energy	Eh
astronomical-unit	ua	illuminance	phot
atmospheric-pressure	bar	kynematic-viscosity **	St
atomic-unit-of-time	$\hbar/Eh$	luminance	sb
bel-logarithm *	bel	magnetic-field	Oe
blood-pressure	mmHg	magnetic-flux-density	G
bohr-radius	a0	magnetic-flux	Mx
crystal-length	A	nautical-mile	M
decibel-logarithm *	dB	nautical-speed	kn
dynamic-viscosity	P	neper-logarithm *	Nb
electron-mass	me	nuclear-cross-section	b
electronvolt	eV	quantum-of-time ????????	$\hbar/mec^2$
elementary-charge	e	reduced-planck-constant *	$\hbar$
energy	erg	speed-of-light (in vacuum) *	c
force	dyn	unified-atomic-mass-unit	Da

# Meta Data Information Needed

```
module: module-metadata
  +--rw modules
    +--rw module* [name revision organization]
      d      +--rw name          yang:yang-identifier
      d      +--rw revision      union
      o      +--rw generated-from? enumeration [not-applicable]
      **     +--rw maturity-level? enumeration
      **     +--rw document-name? string
      xx    +--rw author-email?  yc:email-address
      **     +--rw reference?    inet:uri
      **     +--rw module-classification enumeration
      d      +--rw organization  string          [ieee]
      x      +--rw ietf
      x      | +--rw ietf-wg?    string
      +--rw source-file
      x      +--rw owner         string
      x      +--rw repository    string
      x      +--rw path          path
      x      +--rw branch?       string
```

d - derived from module  
o - omit as optional and not-applicable  
x - not applicable (IETF use only)  
xx - I suggest skipping in favor of "contact", derived from module

# Meta Data Information to Provide

- \*\* - we should provide values for these fields
  - maturity-level  
always 'ratified'  
{ ratified | adopted | initial | not-applicable }  
(since we will only be updating metadata for published modules)
  - document-name  
<specify IEEE document title + version>
  - reference  
<http link to document>
  - module-classification  
{ network-service | network-element | unknown | not-applicable }  
'network-service' - for yang modules that configure across  
multiple network-elements, (e.g. vpn)  
'network-element' - for yang modules that configure only a  
single network-element

# Discussion on Constraint Checking

- | How much or how little checking should be in YANG modules
- | Examples from Don
- | Examples from Mark
- | Building a set of guidelines...

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# IEEE YANG

## Some observations

Don Fedyk LabN Consulting L.L.C.

[dfedyk@labn.net](mailto:dfedyk@labn.net)

# Background

- During the last 6 months I've been looking at YANG and following YANGsters discussions.
- As a newcomer one comment I made was it seemed like IEEE has a more complicated YANG files than some others that are public.
- The other question I had was about automated programming and how much detail we put in a YANG model
- Here is some more input on these two points – perhaps not complete but a couple of insights Yangsters might consider.



# Many good reasons do we do YANG

- Replace SNMP
- Give management objects standard names
- Give the objects a standard type and syntax
- Limit the values of an object to valid values, create defaults
- Re-Use standard other Models definitions
- Create dependencies and hierarchies based on component models
- Provide a Model that can be Validated and “Compiled”
- Publish in public

# Comparison of YANG models

## IEEE

- Build models to cover the full superset of 802.1 functions
- Follow IEEE bridge component models
- Use YANG conditionals (when .. must) etc. to enable functions for permutations of the components
- Reference IEEE Specifications

## Some others:

- Use a leaner style (Based on MACsec/VLAN Models I have observed)
  - Smaller descriptions
  - No or minimal references
- Make heavy use of groupings
- Other – there may be a bit more here

# Auto programming and initialization

## Discussions around YANG:

- Originally a discussion about defaults
  - One argument is initialization code is outside of YANG so don't worry about YANG defaults
  - On the other hand YANG allows defaults and ranges why not use them?
- This led to a discussion about how simple should YANG models be.
- This led to a discussion of being able to compile YANG so why not put in as much detail as possible.
- Where is YANG compiled? – next charts

# YANG compiling to code

There are two areas YANG is being compiled today

1. For the Northbound Interface (Netconf, Restconf etc.)

- In this case - augment the models and produce code for initialization, verification, interface to management functions
  - Highly dependent on the tool chain
- Alternative is to code this manually
  - This is where, for example, defaults get initialized and configuration is validated before being committed.

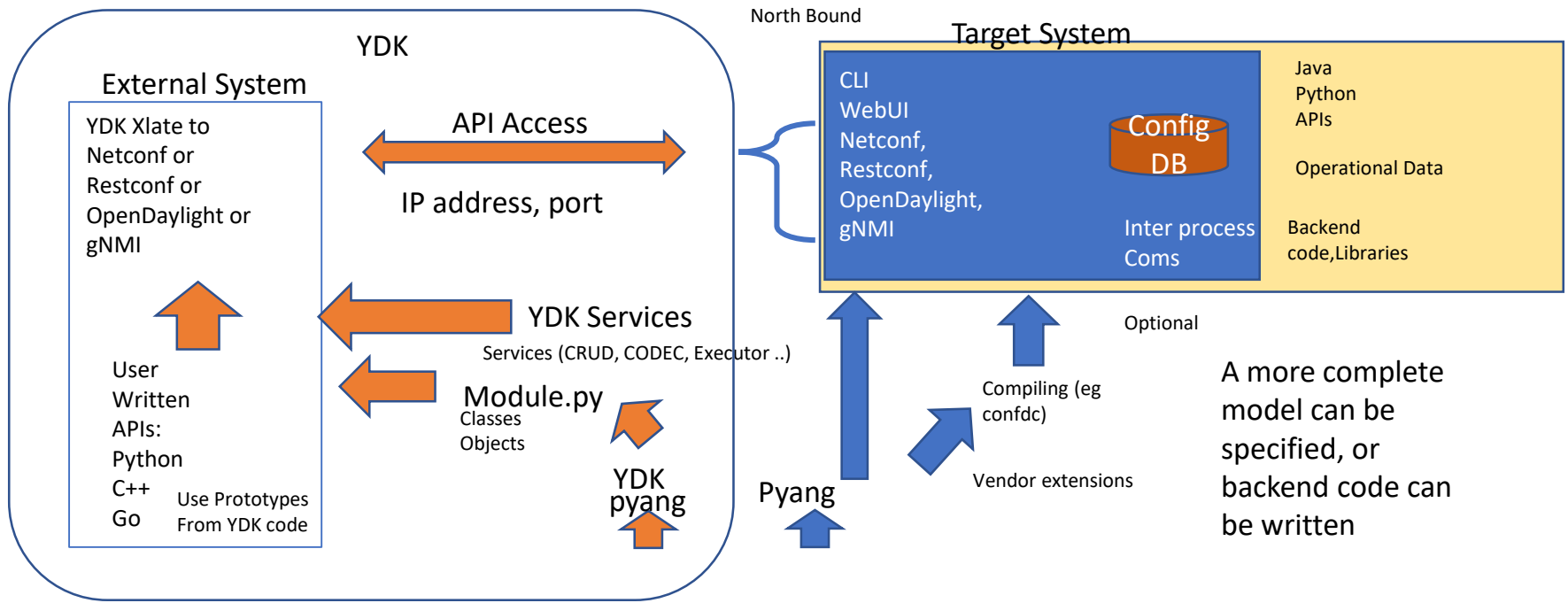
2. For APIs to interface to the North bound interface from external

- YANG Development Kit (YDK) produce class objects and code from YANG.

The common link for these is the YANG model naming and typing of objects.

Note a Validated YANG model can be used by Netconf – I don't count this as compiling

# YANG - YANG Development Kit - Ecosystem



*Names and types are important*

Standard Module.yang

*We are defining the starting point not the whole*

A more complete model can be specified, or backend code can be written

# Conclusions – For Discussion

- IEEE models support IEEE component model
  - This does add dependencies – typically to the bridge model
  - We could use more groupings to expose reusable pieces.
  - Don't worry about code generation
    - yang validation – a must
    - confdc yuma123 etc helps if you can run the model
  - Don't get hung up on defaults – go for functionally and readability.
- If you want code generation
  - Use the standard models as a base.
  - Augment these models for additional code generation

Thank You, Questions?

# Tables Definition

## Leaf-list – no defaults

```
list user-priority-tc {
  key "user-priority";
  description
    "Each entry in the Traffic Class Table
    is a traffic class, represented by an integer
    from 0 through 7 that also comprises
    the numeric value of the four most
    significant bits of the Port Identifier
    component of the SCI for the selected
    SC";
  reference
    "IEEE 802.1AE-2018 Clause 10.7.17";
  leaf user-priority {
    type uint8 {
      range "0..7";
    }
    description
      " Deleted for example ";
  }
  reference
    "IEEE 802.1AE-2018 Clause 10.7.17";
  leaf traffic-class {
    type uint8 {
      range "0..7";
    }
  }
  description
    " Deleted for example ";
  reference
    "IEEE 802.1AE-2018 Clause 10.7.17";
}
```

Simpler and functionally the same except for defaults

## Container – with defaults

```
container user-priority {
  description
    "Each entry in the Traffic Class Table is a
    traffic class, represented by an integer from
    0 (default) through 7 that also comprises the
    numeric value of the four most significant bits
    of the Port Identifier component of the SCI for
    the selected SC.";
  reference
    "IEEE 802.1AE-2018 Clause 10.7.17";
  leaf traffic-class {
    type uint8 {
      range "0..7";
    }
    default 0;
  }
  ...
  container user-priority-7 {
    description
      "Each entry in the Traffic Class Table is a
      traffic class, represented by an integer from
      7 (default) through 7 that also comprises the
      numeric value of the four most significant bits
      of the Port Identifier component of the SCI for
      the selected SC.";
    reference
      "IEEE 802.1AE-2018 Clause 10.7.17";
    leaf traffic-class {
      type uint8 {
        range "0..7";
      }
      default 7;
    }
  }
}
```



# Tables Tree

## Leaf-List

```
| +--rw user-priority-tc* [user-priority]
| | +--rw user-priority    uint8
| | +--rw traffic-class?  uint8
```

## Container

```
| +--rw user-priority-0
| | +--rw traffic-class? uint8
+--rw user-priority-1
| +--rw traffic-class?  uint8
+--rw user-priority-2
| +--rw traffic-class?  uint8
+--rw user-priority-3
| +--rw traffic-class?  uint8
+--rw user-priority-4
| +--rw traffic-class?  uint8
+--rw user-priority-5
| +--rw traffic-class?  uint8
+--rw user-priority-6
| +--rw traffic-class?  uint8
+--rw user-priority-7
| +--rw traffic-class?  uint8
```

# Motion

- | 802.1 authorizes monthly teleconferences for the YANGsters group convening on the last Tuesday of every month from 10:00 AM (US-Eastern) to 11:00 AM(US-Eastern), starting 26 November, 2019
  - | Caveat: The December meeting will be on 17 December, 2019 due to holidays
- | Access information is posted on the <https://1.ieee802.org/yangsters/yangsters-call-information/page> and will be updated as necessary.
- | Agenda will be announced on the 802.1 email reflector at least 5 days before the call.
  
- | Proposed: János Farkas
- | Second: Stephan Kehrer
  
- | Approved...

# AoB

| TBD

# Thanks!