

Taming the Floods of Maintenance Notifications

Maintenance Schema



Barry O'Donovan

@ComePeerWithMe / @barryo79

EPF10 - Spain



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

The Problem



- Every network needs service affecting maintenance
- Notifications need to be sent **and received** for service affecting maintenance
- Typically, these are done by email by ISPs / IXPs presently.

- Every network needs service affecting maintenance
- Notifications need to be sent **and received** for service affecting maintenance
- Typically, these are done by email by ISPs / IXPs presently.
- This presents a number of problems:
 - email overload



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

The Problem

- Every n
- Notifica
- Typicall
- This pre
- email o



ance

- Every network needs service affecting maintenance
- Notifications need to be sent **and received** for service affecting maintenance
- Typically, these are done by email by ISPs / IXPs presently.
- This presents a number of problems:
 - email overload
 - missed notifications
 - changed aliases, staff rotation, staff promotion, inappropriate distribution lists
 - manually intensive
 - despair / couldn't be bothered keeping up!
- A solution?
 - Publish maintenance details via an agreed JSON schema



i n t e r n e t n e u t r a l e x c h a n g e

Rationale - Provider View

- All networks announce service affecting maintenance
- Announcement / customer mailing lists are always out of date / inaccurate
- Notifications all have a common subset of data:
 - start and end time
 - description of services affected
 - contact details of on call support team
 - short after action report
- These are all typically unformatted emails
- This sucks and does not allow for automation



Rationale - Customer View

- Even medium sized networks receive a flood of maintenance notifications
 - Quiet often, from old services
 - Quiet often, from services that never made it past a sales enquiry!
- They usually **do not** receive the ones that actually matter
- Exceptionally difficult to find and understand upstream networks' procedures for:
 - announcing maintenance windows
 - publishing planned maintenance windows
 - understanding who receives announcements for maintenance windows
- Managing / sharing / scheduling work around floods of maintenance notifications is time consuming
- Cost efficiency and proper management requires automation



INEX generated ~100 maintenance related notifications in the last 12 months



The Problem - In Numbers

INEX generated ~100 maintenance related notifications in the last 12 months

Average of 2 / week

Doesn't sound like much, right?



The Problem - In Numbers

INEX generated ~100 maintenance related notifications in the last 12 months

“small-ish” IXP on the western edge of Europe
~80 members, 6 PoPs, 2 LANs, 100Gbps peaks

ASN Database

[Stats](#)[Search](#)[Recent](#)[Common](#)

AS#

COMPANY

PRESENT AT

IPV6

[20940](#)[Akamai Technologies](#)

73

Y

[6939](#)[Hurricane Electric](#)

71

Y

[15169](#)[Google](#)

67

Y

[3856](#)[Packet Clearing House](#)

58

Y

[42](#)[PCH/Woodynet DNS Anycast](#)

53

Y

[8075](#)[Microsoft](#)

46

Y

[22822](#)

Limelight Networks Inc.

43

Y

10310	YAHOO!	28	
15133	EdgeCast Networks	27	
26415	Verisign J-ROOT Mirror	26	
16265	Fiberring / Leaseweb	25	
20144	ICANN L-Root Mirror	25	
5580	Atrato IP Networks	25	
16509	Amazon	24	
19151	WV FIBER D/B/A Ibis7	23	
32934	Facebook	23	
34695	E4A	23	
8928	Interoute	22	
6453	TELEGLOBE	22	
8220	Colt Telecom	21	
15412	FLAG TELECOM NETWORKS USA LTD.	21	
1273	CABLE & WIRELESS	21	
13030	Init7	21	

The Solution?



Growing trend towards automation
Growing acceptance of the need for agreed schemas



The History?

Discussions on solving this problem
has come up many times.

Yet, no solution*.

*) that I know of at least....



We're Not Promising the Ultimate Solution

This is not a *fait accompli* proposal.

Opening a discussion
(with skin in the game)

EPF -> NANOG(?) -> Euro-IX -> RIPE



We're Not Promising the Ultimate
Solution, But...

We have a good track record

IXP Manager, JSON Export Schema

<https://github.com/inex/IXP-Manager> / <https://github.com/euro-ix/json-schemas>

**IXPs can generally move fast to implement
when community demand exists**

Maintenance Schema

- Agreed industry standard format with minimal required information
- Uses the KISS principal: **Keep It Simple, Stupid**
 - Goal is to get to a better place than where we are
 - Goal is not to encapsulate every imaginable maintenance type / situation
- Basic minimal required information will include:
 - Schema version
 - Organisation details
 - Support contact details
 - Maintenance window(s) - start / stop time, summary, description, after action report
- Optional (but recommended) to include live updates



Schema Example Definition

```
{  
  "version":      "0.1",  
  "timestamp":    "2015-01-28T00:00:00Z",  
  "source":       "https://www.example.com/maintenance.json",  
  
  "organisation": {},  
  "support_details": {},  
  "windows": [  
    {}, ...  
  ]  
}
```



Schema Example Definition

```
"organisation": {  
  "name": "INEX",  
  "url": "https://www.inex.ie/",  
  "type": "ixp", (or "isp")  
  "peeringDB_ix_id": 48, (or "peeringDB_net_id")  
  "asn": 2128  
},
```



```
"support_details": {  
    "url": "https://www.inex.ie/support/",  
    "email": "operations@inex.ie",  
    "phone": [ "35315313339" ],  
    "notes": "Support is available..."  
},
```



Schema Example Definition

```
"windows": [  
  {  
    "id": "uuid",  
    "type": "planned",  
    "planned_time_start": "2015-09-01T00:00:00Z",  
    "planned_time_stop": "2015-09-01T02:00:00Z",  
    "summary": "Software upgrade & reboot of swi1-tcy1-1",  
    "details": "INEX is scheduling a ...",  
    "action_required": "no"  
  },  
  { ... }, { ... },  
]
```




Schema Example Definition

```
"windows": [  
  {  
    "id": "uuid",  
    "type": "planned",  
    "planned_time_start": "2015-09-01T00:00:00Z",  
    "planned_time_stop": "2015-09-01T02:00:00Z",  
    "summary": "Software upgrade & reboot of swi1-tcy1-1",  
    "details": "INEX is scheduling a ...",  
    "action_required": "no"  
  },  
  { ... }, { ... },  
]
```



Schema Example - Type

- **planned:** scheduled in advance as per *normal maintenance* procedures
- **unplanned:** typically a **live outage** - this is happening right now, take `planned_time_stop` as an *estimated time for restore*
- **emergency:** while it is planned, it is also outside of normal maintenance procedures and will happen soon. Usually <24 hours.
- **noncritical:** informational purposes only, not service affecting. Typical examples include:
 - non-production maintenance such as management connectivity
 - email / phone support issues



Schema Example Definition

```
"windows": [  
  {  
    "id": "uuid",  
    "type": "planned",  
    "planned_time_start": "2015-09-01T00:00:00Z",  
    "planned_time_stop": "2015-09-01T02:00:00Z",  
    "summary": "Software upgrade & reboot of swi1-tcy1-1",  
    "details": "INEX is scheduling a ...",  
    "action_required": "NO"  
  },  
  { ... }, { ... },  
]
```



i n t e r n e t n e u t r a l e x c h a n g e

Schema Example - Summary / Details

- Summary: equivalent to an email subject. Brevity is appreciated!
- Details: equivalent to an email body. Put your detail here including, in the case of an IXP, full list of members affected for example.
- Details should support Markdown syntax
 - plain text formatting syntax
 - no loss of detail if not converted to HTML
 - no tags to strip / no processing required
 - if used, can add greater clarity and detail



Schema Example Definition

```
"windows": [  
  {  
    "id": "uuid",  
    "type": "planned",  
    "planned_time_start": "2015-09-01T00:00:00Z",  
    "planned_time_stop": "2015-09-01T02:00:00Z",  
    "summary": "Software upgrade & reboot of swi1-tcy1-1",  
    "details": "INEX is scheduling a ...",  
    "action_required": "yes",  
    "action": "Tear down BGP sessions in advance."  
  },  
  { ... }, { ... },  
]
```



Schema Example - Action Required

- **yes** - member / customer action required
- **no** - no action required. e.g. IXP / ISP will bring down BGP sessions in advance
- **recommended** - at the customers' discretion - for example, an IXP with switches incapable of L3 IPv6 ACLs cannot force IPv6 sessions down but IPv6 amounts to <<1% of overall traffic. *recommended* may be more appropriate than *yes*.
- For *yes* and *recommended*, the details of the advised / required action should be included in a "action": key/value pair. This is optional for *yes*.



Schema Example Definition

```
"windows": [  
  {  
    "id": "uuid",  
    "type": "planned",  
    "planned_time_start": "2015-09-01T00:00:00Z",  
    "planned_time_stop": "2015-09-01T02:00:00Z",  
    "summary": "Software upgrade & reboot of swi1-tcy1-1",  
    "details": "INEX is scheduling a ...",  
    "action_required": "no"  
  },  
  { ... }, { ... },  
]
```



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Advanced Schema Example - Affected IPs

```
"windows": [ {  
  "addresses_affected": [  
    "193.242.111.8",  
    "2001:7f8:18::8"  
  ],  
  }, ... ]
```

- Ideally suited to IXPs
 - could have circuit_id / service_id / asns / etc also
- Identify IXP peers who will be affected by a maintenance window. Unaffected members can then ignore / silence peer down alerts with these (for example).
- ISPs could use with authenticated API requests



i n t e r n e t n e u t r a l e x c h a n g e

Schema Example - Updates

- Realtime updates on start / completion, issues, rescheduling, etc can be very useful:

```
"windows": [ {  
  ...,  
  "updates": [ {  
    "id": 10,  
    "timestamp": "2015-01-28T00:10:00Z",  
    "type": "started,completed,update,restarted,rescheduled,cancelled",  
    "rescheduled_id": "uuid",  
    "notes": "This maintenance window is now..."  
  }, ... ],  
}, ...  
]
```



Schema Example - Updates

- Typical updates sequence:

1. update: This maintenance window will begin as planned in 1 hour
2. start: This maintenance window begins now
3. update: Due to unforeseen complications, this maintenance window is expected to run over by 30mins
4. completed: This maintenance window is now complete. After action / summary will be issued in approx. 1 hour.
5. update: Maintenance Report: tonight's maintenance window proceeded as scheduled but ran later than planned due to...

Been here before. So friggin' bored right now.





ERR: TOO_MUCH_EFFORT

Networks / IXPs will never implement this

<insert many valid reasons>



Networks / IXPs will never implement this

<insert many valid reasons>

We promised skin in the game...



Promised skin in the game...

<https://www.maintenancemanager.org/>

A working proof of concept.

A statement of intent.



Promised skin in the game...

Implemented:

- Register / Authentication
- Add network(s) *(first come, first served)*
- Add a maint window & updates
- JSON export



Promised skin in the game...

Planned:

- ical export - others? rss?
- Network verification
- Multiple users to networks
- Directory, Subscriptions, Emails



Practical Uses

I just want to add an IICAL feed to my own calendar
JSON Maintenance Schema => IICAL - easy!

We use RSS feeds internally
JSON Maintenance Schema => RSS - easy!

You know, I'm pretty happy with emails
JSON Maintenance Schema => Email - easy!

Add intelligence:

Just show me the windows that affect me!

/peerip/1.2.3.4

/asn/64511

/customerid/4685

Thank you!

<https://www.maintenancemanager.org/>



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Barry O'Donovan

@ComePeerWithMe / @barryo79

barry.odonovan@inex.ie

EPF10 - Spain