Using Performance Co Pilot to monitor SNMP devices

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http://wob.zot.org/2/projects/show/pcp

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What is SNMP?

- Hopefuly familiar to this audience
- **S**imple **N**etwork **M**onitoring **P**rotocol is used for monitoring any devices (eg, routers or switches)
- Uses an open ended “OID” dotted number, translated to an open ended text metric name.
- Out of Band “MIB” files describe name to number mappings and contain the metric semantics

  Eg: `1.3.6.1.2.1.1.3.0` is `sysUpTime.0`
- The main industry standard for monitoring

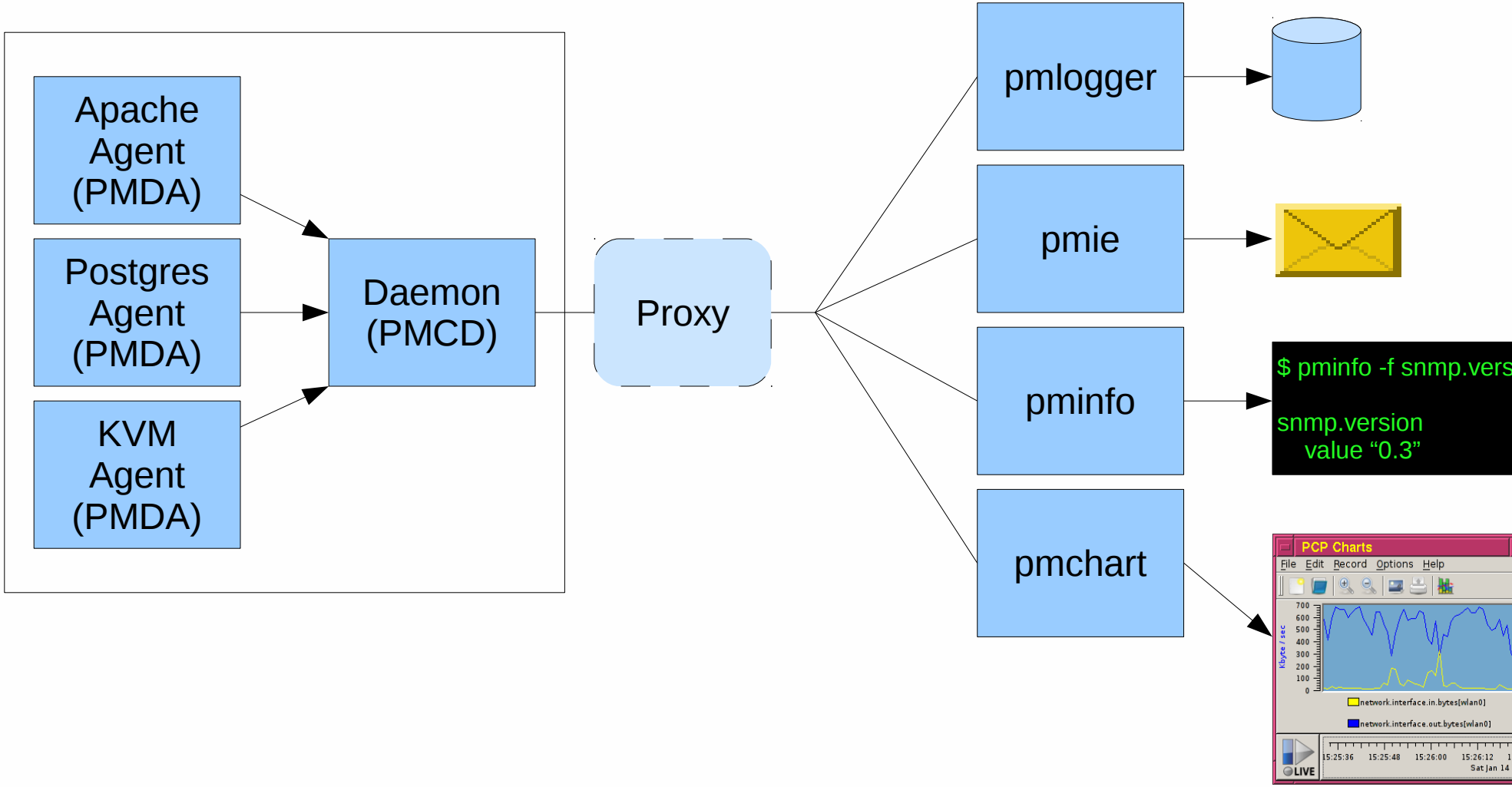
Origins of Performance CoPilot

- How do you monitor a 512 processor machine
  - top does not scale!
- How do you monitor a cluster of 20x512 processor machines?
- How do you know if what you are observing today has happened before?
- How do you correlate today's event with other activity on the system?

PCP Overview

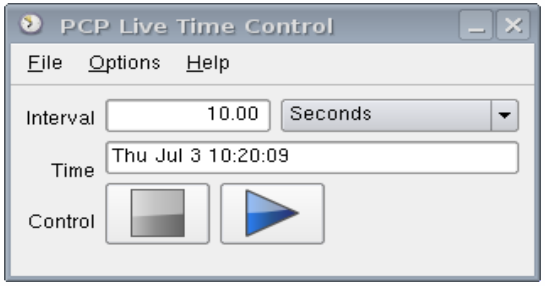
- What is PCP?
  - **P**erformance **C**o-**P**ilot
  - Open source **toolkit** for system level performance analysis
  - Live and historical
  - Extensible (monitors, collectors)
  - Distributed

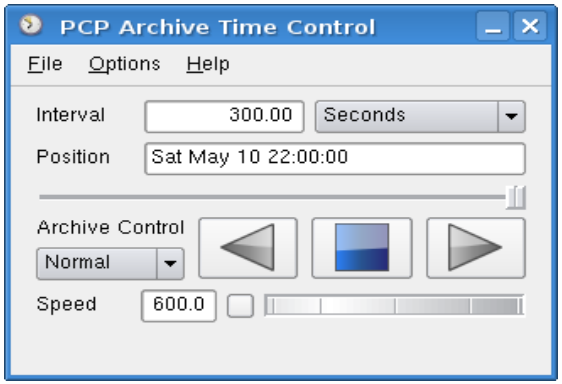
Architecture

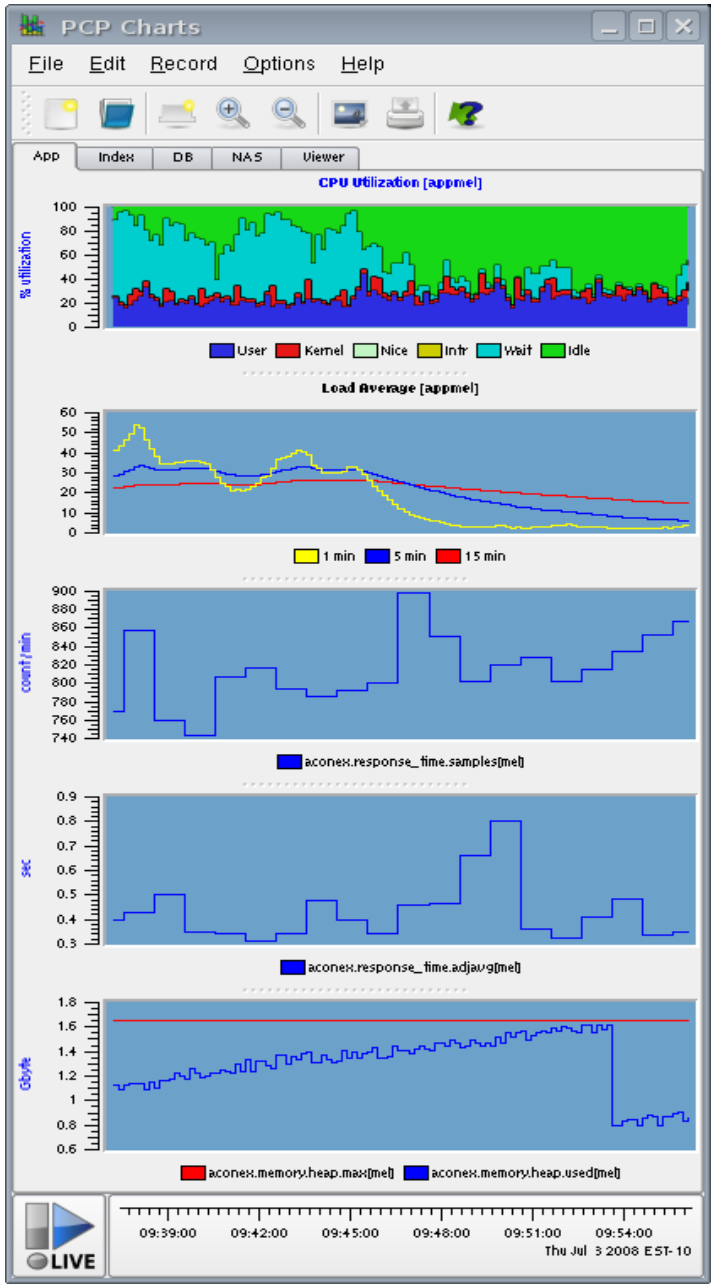


Monitor tools

- pminfo, pmprobe, pmdumptext
- pmlogextract, pmlogsummary, pmwtf
- pmchart
- pmstat
- pmie







PCP toolkit includes

- One common protocol for both archives and live
- Real time Conditional Alerting
- Log analysis tools
- A GUI charting tool
- Both Centralised and distributed

PCP compared to SNMP

- Also Monitors devices
- Has an open ended metric names but a fixed size number space

  Eg: `kernel.percpu.cpu.sys` is `60.0.2`
- The Agent (PMDA) defines all the semantics of each metric, including the name to number map

- Homepage: http://oss.sgi.com/projects/pcp/

Why an SNMP bridge?

- At work, we use PCP extensively
- This leaves out monitoring of all non general purpose OS systems - at least these:
  - Network Switches, Power Rails
  - SAN systems, Server LOM
- Also, the rest of the world uses SNMP
- No general purpose PCP to SNMP gateway exists

What I wanted

- Load SNMP hostnames and credentials
- Determine enough metadata to export the right PCP metric info
- Allow side-by-side logging of SNMP and PCP and comparison within the existing tools
- Provide a dynamic interface to debug and discover SNMP data

Demo

- pmchart monitoring network traffic

Not Demo

- Pminfo:

```
$ pminfo -f snmp.host.localhost.1.3.6.1.2.1.2.2.1.2
snmp.host.localhost.1.3.6.1.2.1.2.2.1.2
    inst [1 or "1"] value "lo"
    inst [2 or "2"] value "eth0"
    inst [4 or "4"] value "wlan0"
    inst [8 or "8"] value "usb0"
```

- Config:

```
host localhost $COMMUNITY
map single 1.3.6.1.2.1.1.3.0    TIMETICKS 1  sysUpTime
map column 1.3.6.1.2.1.2.2.1.2  STRING    10 ifDescr
map column 1.3.6.1.2.1.2.2.1.10 COUNTER32 +  ifInOctets
```

TODO ..

- Add multi threading and caching to avoid timeouts
- Improve the PCP Perl bindings
- Add Dynamic mappings!
- Load the MIBS, lose the numbers
- Add Virtual Hosting to PCP
- Lots of fine tuning as well …

- Performance Co Pilot Homepage: http://oss.sgi.com/projects/pcp/

- My SNMP gateway patchset: http://wob.zot.org/2/projects/show/pcp

Thank You

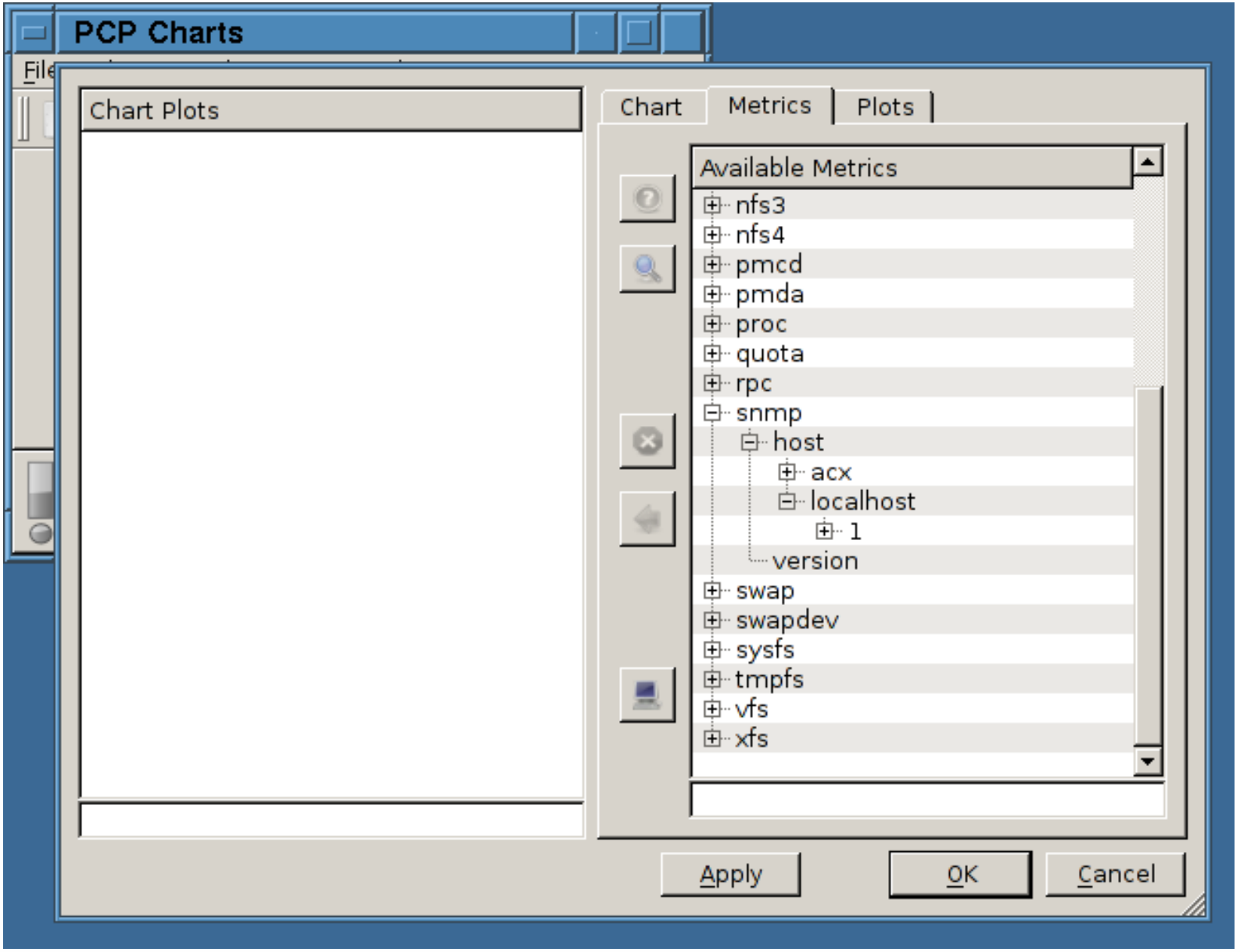
- Questions?
- Performance Co Pilot Homepage:
  http://oss.sgi.com/projects/pcp/
- My SNMP patchset:
  http://wob.zot.org/2/projects/show/pcp
  git://wob.zot.org/9/pcp.git

Schema

- ls:

  `snmp.host.$hostname.N...N` or `snmp.host.$hostname.N...N[rownr]`

- PCP “PMID”s: 22bits
  - each metric name has an ID
  - Config defines static mappings, then add an offset for each host (pmid = (hostID * maxmaps + mapID))
- Instance IDs: 32bits, currently only used for simple table rows


PCP Charts
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nfs4
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pmda
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vfs
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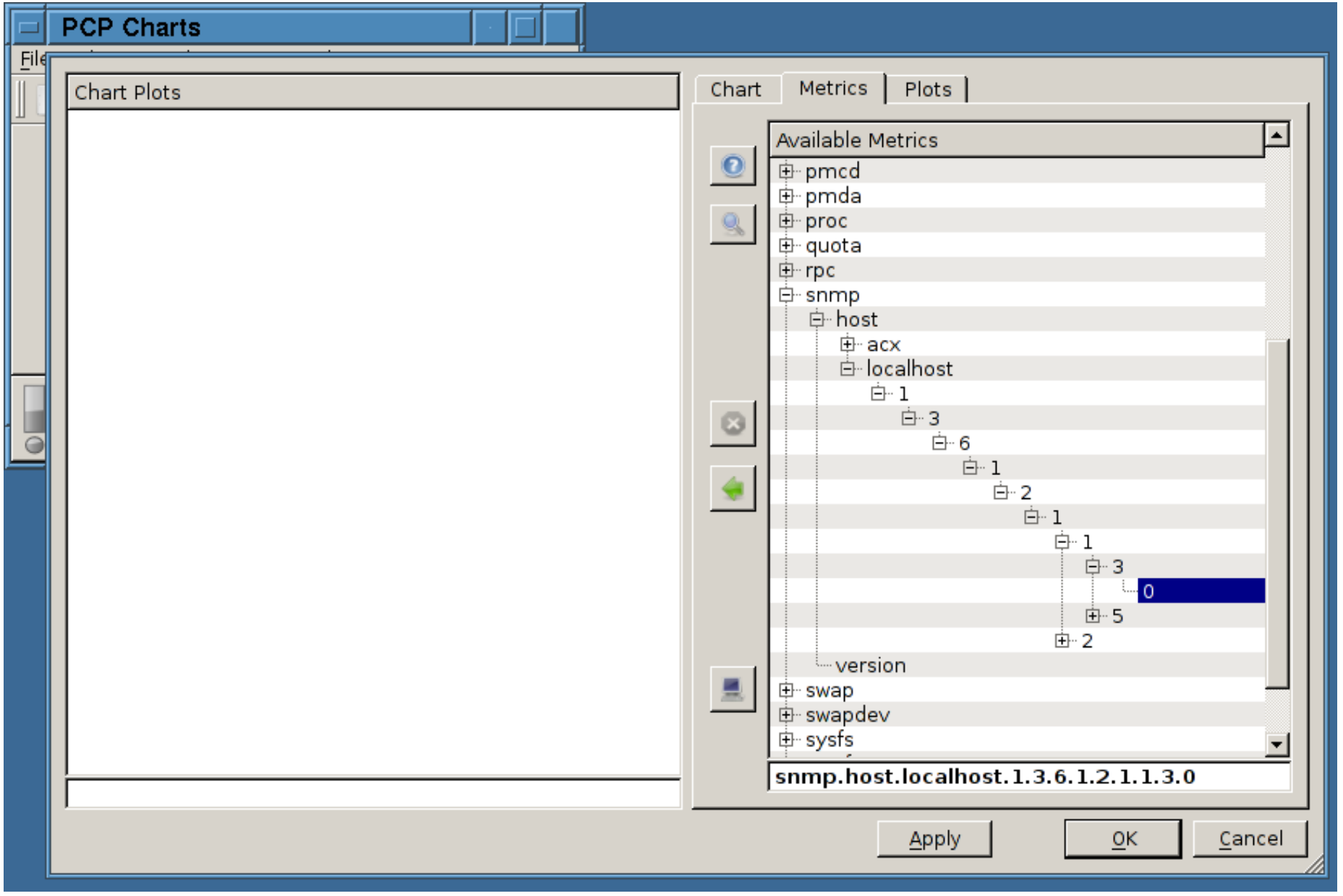
PCP Charts
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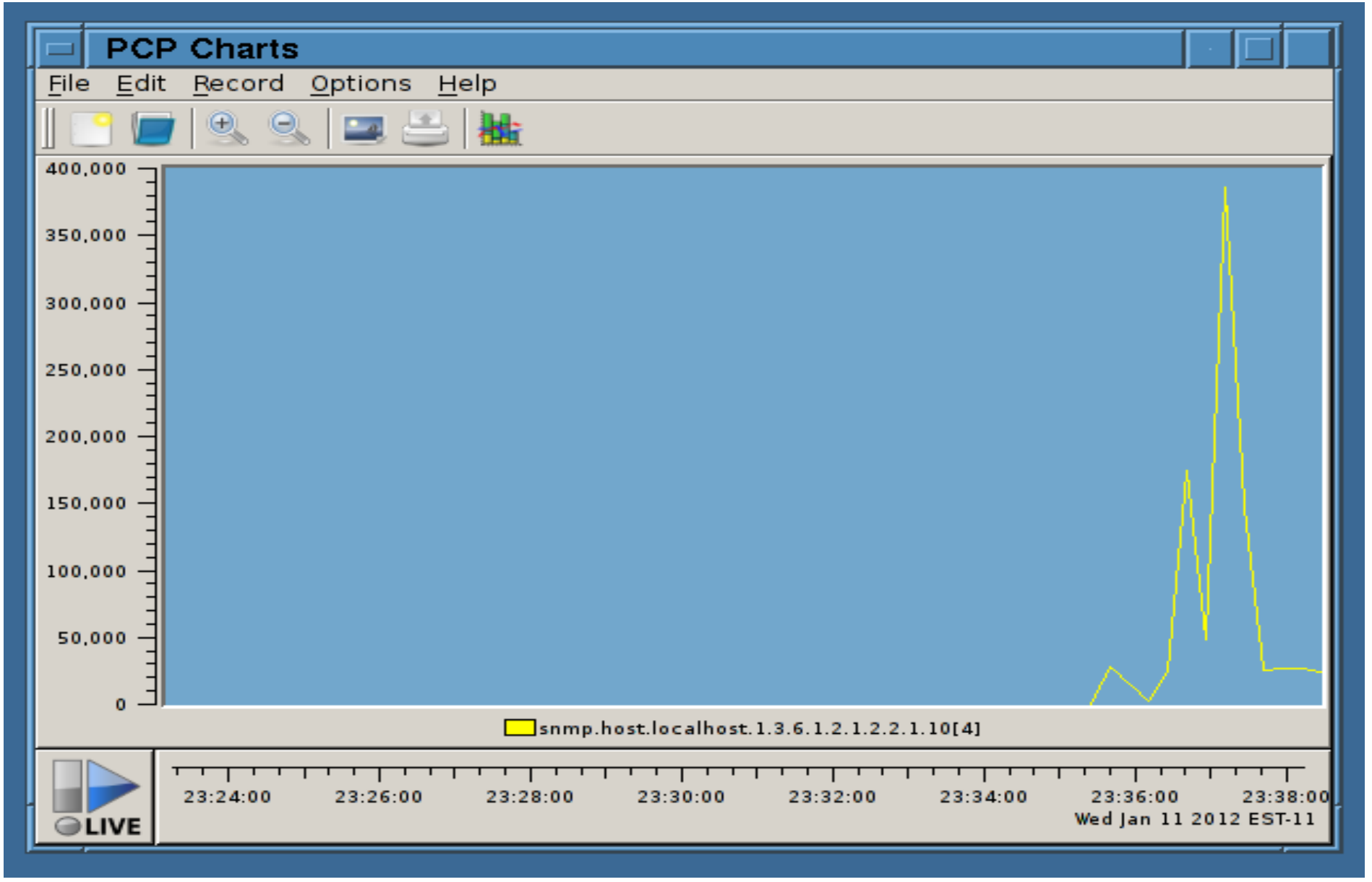
PCP Charts
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snmp.host.localhost.1.3.6.1.2.1.2.2.1.10[4]
LIVE
23:24:00
23:26:00
23:28:00
23:30:00
23:32:00
23:34:00
23:36:00
23:38:00
Wed Jan 11 2012 EST-11