

Network management tools: Torrus, Gerty, Mooxu

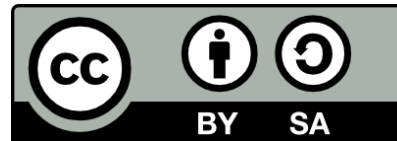
DENOG3

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The alert sign is a Public Domain clip art available at <http://www.openclipart.org/detail/26697>

Agenda

- General introduction
- Torrus + SIAM + Extopus software
- Gerty software
- Moxu project overview

Introduction

- About myself
- Open-source vs. closed-source software
- All products in this presentation are free, open-source software (Perl mostly)

Torus and related software

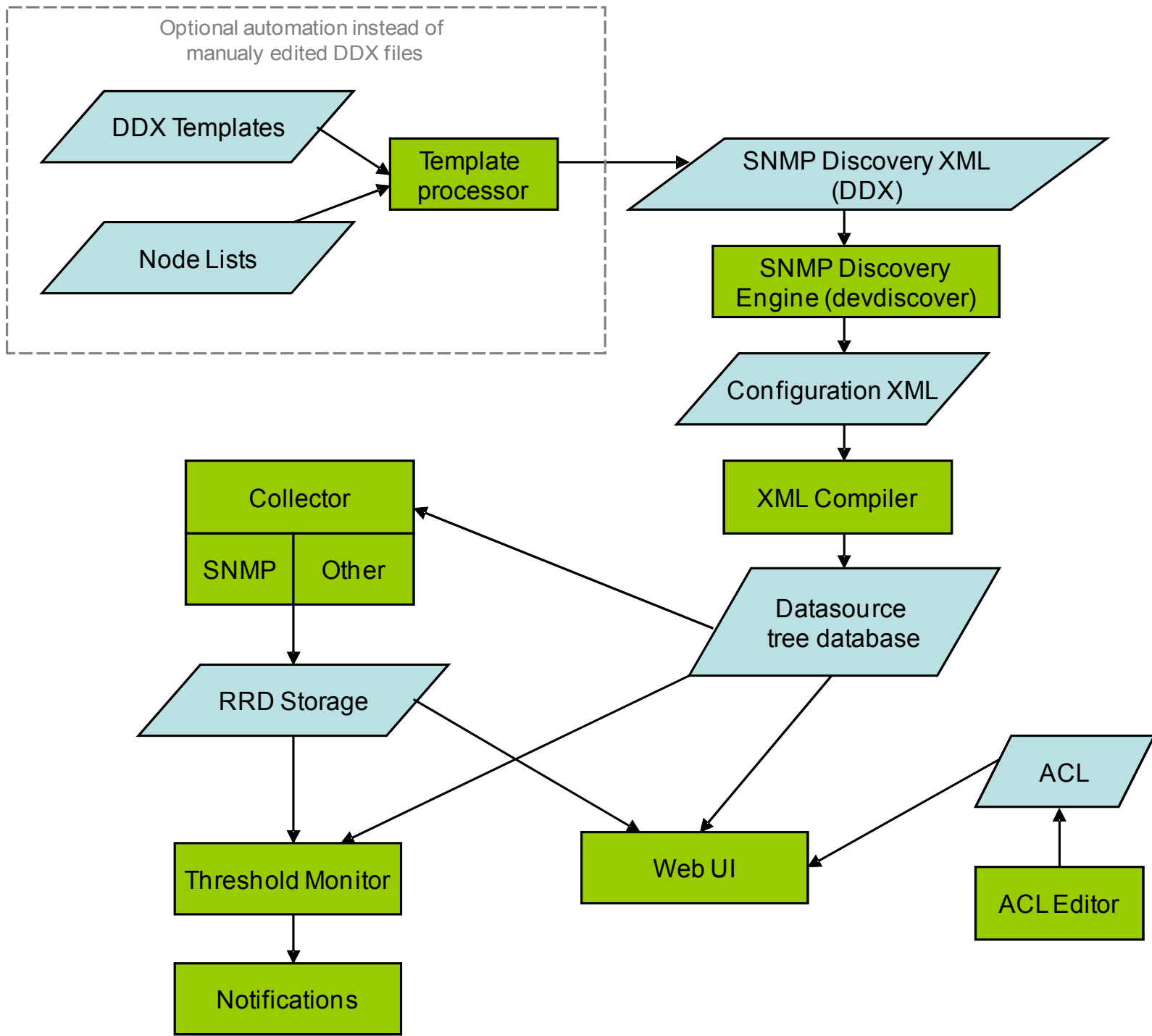
- Torus software overview
- SIAM library
- Extopus software overview
- Torus + SIAM + Extopus integration

Torrus overview

- Started in 2002 because of Cricket limitations
- Traditional task: 5-minute statistics collection
- RRDtool as a storage
- Highly scalable collector
 - ~1M SNMP OID's every 5min from a single server
- Modular architecture
- Designed for automated provisioning

Torrus overview (cont.)

- Modular SNMP discovery engine
 - More than 40 vendors and standard MIBs
- Simple Web UI with tree navigation
- (perl) Plugin API for easy customization and extension



SNMP discovery engine

- Multi-threading and queuing: suitable for fast and slow networks
- Controlled by XML files
- API for assigning custom properties to discovered objects and for custom processing

Torrrus configuration database

- Tree structure in BerkeleyDB database
- Benefits:
 - ◆ object hierarchy
 - ◆ top-down property inheritance
 - ◆ speed

Torus configuration DB (cont.)

- Drawbacks:
 - ◆ shared-memory BDB architecture → possible crashes
 - ◆ tree structure unsuitable for incremental updates → long re-compilation times
 - ◆ file-based DB → not so easy for clustering

Torrus Collector

- Modular architecture, suitable for non-SNMP polling and non-RRD storage
- 99% of uses are SNMP + RRD anyway :)
- Background thread for storage updates
- Scheduler for splitting the job across the whole period
- Multiple collector processes per tree

Performance benchmark

- 2x Quadcore XEON 3.00GHz, 20GB RAM, 6x72GB 15k disks in RAID1 + 0
- 6400 devices (small access routers mostly)
- SNMP objects: 550000
- Polling period : 5 minutes
- 12 collector processes
- CPU usage: average idle time around 90% when GUI is not in use.

Threshold monitor

- Flexible RPN expressions for threshold monitoring
- Possibility for composite formulas on several datasources
- Flexible notification engine, can send SNMP traps, emails or fire any other script

NodeID concept

- NodeID is a static ID for Torrus data objects
- NodeID value can be supplied by northbound OSS systems
- Graphs and data can be delivered to external systems like front-desk dashboards or customer portals (using NodeID as reference)

Example: m-net.de, fibrenoire.ca

- All port descriptions in a special format
 - `bw = 200M; assetid = VPNLINK00055; ct = BC`
- Port parameters are inherited by Torrus
- External systems fetch graphs by asset ID
- All functionality is in *m-net* plugin

SIAM library

- Service Inventory Abstraction Model
- Provides a uniform API to enterprise's service inventory DB
- Core SIAM module published at CPAN
- Enterprise-specific drivers need custom development

SIAM object hierarchy

- **Contract**
 - refers to the customer contract or customer ID
- **Service**
 - refers to the product name and service ID (e.g. WAN Internet, with given bandwidth, SLA, ...)
- **ServiceUnit**
 - refers to a physical object, such as device port
- **ServiceDataElement**
 - data associated with the physical object (port traffic, ...)

Other SIAM objects

- Device
 - used for network monitoring integration
- AccessScope, ScopeMember, User, Privilege
 - organize access privileges for UI users

SIAM::Driver::Simple

- Reads the whole data from a YAML file
- Used mostly for testing and demo purposes

Extopus

- Developed by Tobi Oetiker, the author of RRDtool and MRTG
- Data and UI aggregator for monitoring systems
- Web2.0, Javascript-based interface
- Easy to integrate with back-end systems

Torrus + SIAM + Extopus integration

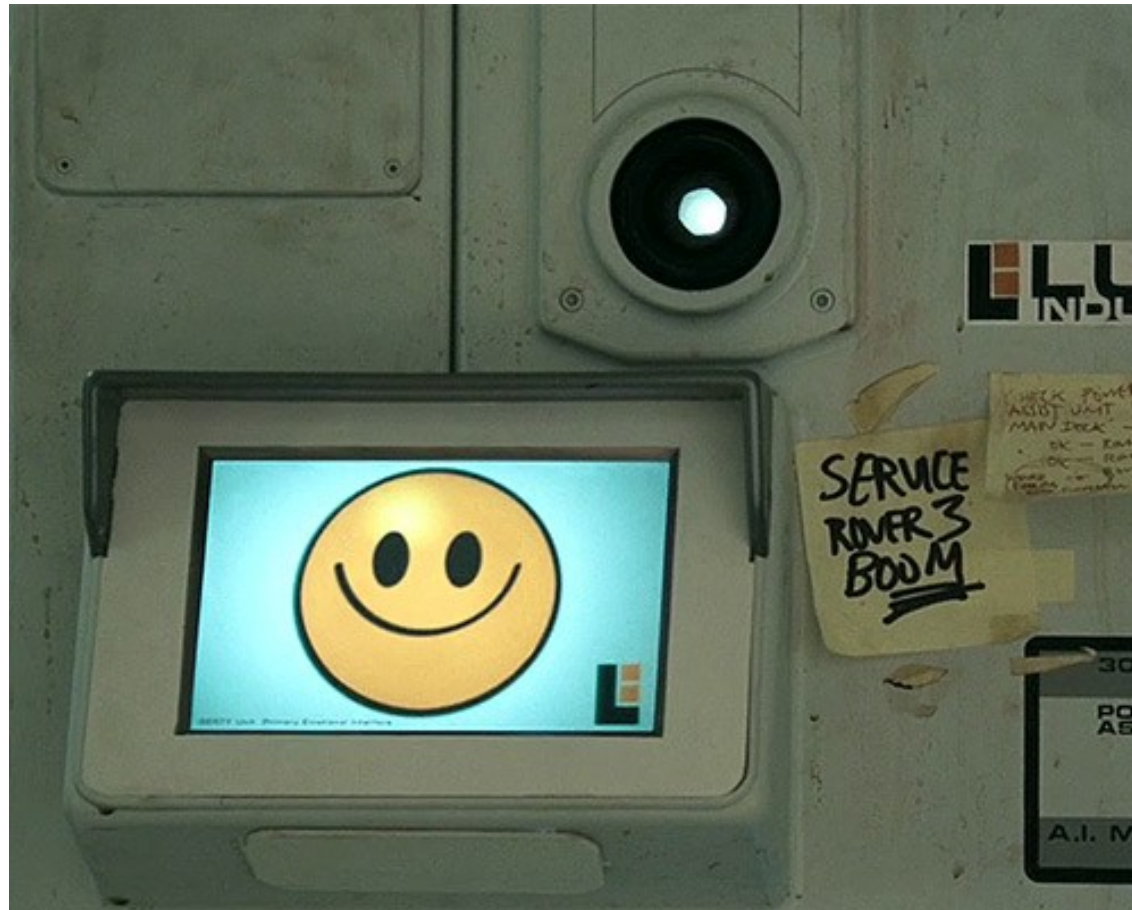
- SIAM pulls service inventory data from enterprise OSS
- Torrus populates its SNMP discovery with SIAM data
- Extopus pulls service inventory and privileges from SIAM and graphs and tabular data from Torrus

Torrus + SIAM + Extopus (cont.)

- Extopus presents the data in a service-centric way, suitable for customer portals and customer support desks
- Fully automated solution, driven by the enterprise inventory databases
- Demo available:
<http://demo.oetiker.torrus.net/>

Questions?

Gerty



Credit: Moon (2009) by Duncan Jones, with Kevin Spacey's voice

Gerty: helping a human

- Automation tool for network operation tasks
 - Collecting status and configuration data
 - Executing commands
 - Parallel, massive execution
- Various management access interfaces
 - Telnet/SSH command line
 - SNMP
 - NETCONF
 - TL/1

Gerty software

- Easy command-line interface
- Configuration in INI files
- Device lists from plaintext files or SQL DB
- Easy to extend (Perl knowledge needed)
- Started as alternative to RANCID, grown into a much broader tool
- Release coming soon, but development version is already usable

Gerty software architecture

- Modular design
- Vendor-agnostic core package
- Vendor-specific plugin packages
- Custom scripts not mixing with the distribution packages

Gerty usage examples

- Device configuration backup
- VPLS MAC counts on Juniper MX platform: per-instance and per-VLAN counts for every routing instance, stored in SQL DB
- 15-minute HDSL line quality statistics (ES, SES, CRCA, LOSWS, UAS) collected every few hours and stored in SQL DB

Gerty usage examples (cont.)

- Chassis hardware types, serial numbers, IOS versions for Cisco devices, stored in SQL, with change history
- Port status, CDP neighbours, UDLD status for Cisco devices, stored in SQL, with change history

Questions?

Mooxu project

- Project in concept design phase
- Distributed network testing platform
- Agents anywhere in the network, making tests and collecting data
- Distributed data storage
- Central management for test tasks and accessing the results

Mooxu usage examples

- Agents at the edge of IPTV distribution network, periodically subscribing to multicast channels, checking the response time and availability of TV channels. If powerful enough, also MPEG stream quality analysis

Mooxu usage examples (cont.)

- Ad-hoc monitoring: the customer support engineer requests port traffic monitoring every 5 seconds via the ordering GUI (Extopus?). The testing starts immediately, with graphs updating every minute, displayed in an interactive GUI (Extopus?).

Mooxu project status

- Concept design phase, waiting for budget approval
- stay tuned!

Questions?

Links

- Extopus: www.extopus.org
- Torrus: www.torrus.org
- SIAM: search.cpan.org/dist/SIAM/
- Gerty: github.com/ssinyagin/gerty
- Mooxu: txlab.wordpress.com/tag/mooxu/
- Tobi Oetiker: oss.oetiker.ch
- My company: www.k-open.com