



Bergamot Monitoring 2.0.0

Open Source Distributed Monitoring

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Bergamot Monitoring

- Started by me, over a year ago
- Circa 1,200 commit
- ~79,000 lines of code in Bergamot
- ~60,000 lines of code in supporting modules
- Active project, if only one developer



v2.0.0 (Yellow Sun)
released today!



Features - Nagios Compatible

- Executes Nagios plugins, reuse any existing Nagios plugin you are using or can find
- Native, non-blocking NRPE support
- Import and convert pre-existing Nagios configuration
- Easy migration path from Nagios



Features - Metrics

- Metrics out of the box, store quantitative data about checks, EG: disk I/O, HTTP response time. Displayed as line graphs
- Parses Nagios performance data by default, zero configuration needed
- Graph data available via the API



Features - Distributed

- Distributed by default, not added as an afterthought
- Allows for geographic distribution of check execution
- Only need to distribute worker nodes geographically



Features - Modular

- Workers

- Nagios / NRPE
- SNMP
- HTTP
- Bergamot Agent
- JDBC

- Notifiers

- Email
- SMS
- WebHook



Features - Scalable

- Check executions naturally load balance across available workers
- Easy to add more check capacity by deploying new worker nodes
- UI clustering allowing for horizontal scaling. Spreading UI, scheduling and result processing across a pool of servers



Features - Resilient

- Can tolerate the loss of worker, notifier and UI nodes.
- Should a node fail, another picks up the work
- Should all workers fail, checks will timeout and alert



Features - Persistent

- Configuration, state, metrics - are all stored in a PostgreSQL database
- Possible to write complex reports against monitoring state using external tools
- Configuration changes are made atomically online, requiring no downtime, nor reload windows

Features - Modern UI, Real Time



- A modern user interface, offering a clean, visual presentation of monitoring state
- Real time updates via WebSockets. Checks can execute and be displayed in a matter of milliseconds
- Real time alerts to the browser should a check alert



Secure

- Complete and fine grained access control model, only let people see what they need to see
- Bergamot Agent authenticates using public key infrastructure
- TLS used on web interface by default
- Strong password hashing (BCrypt)



Features - Extensible, Open

- A JSON REST API allows for people to integrate and extend Bergamot Monitoring easily.
- Scriptable check engines, fast, efficient checks implemented using JavaScript
- Easy develop new check engines
- Open Source - Under LGPL V3

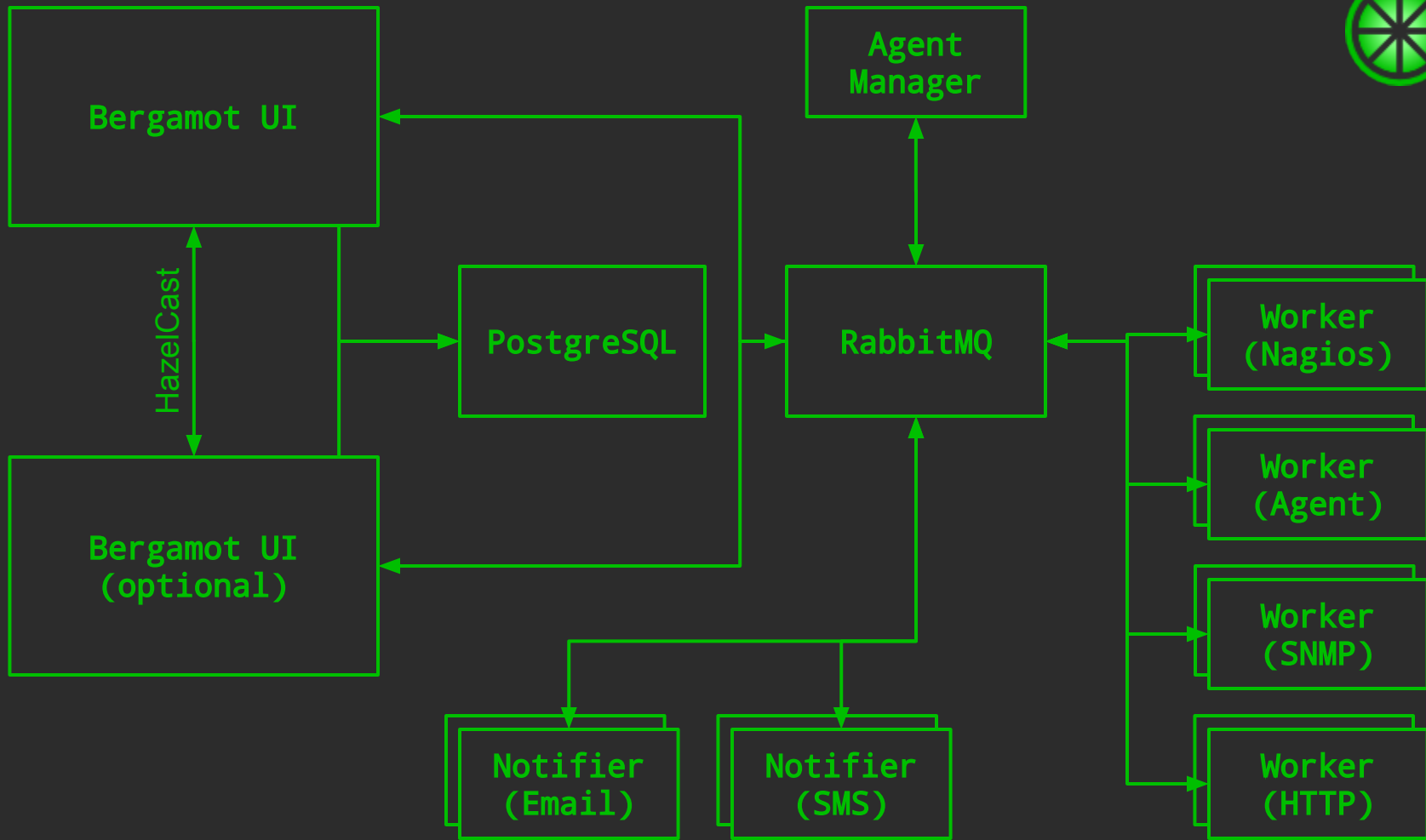


Behind The Scenes



Architecture

- Functionality is separated into different services, which communicate via message queues
- Each service is specialised, doing one thing and doing it well
- Services are loosely coupled, making it easy to modularly add new functionality





Architecture

- **Workers**
 - Handle actually checking things, specialised by what they check, eg: nagios, NRPE, SNMP, HTTP
- **Notifiers**
 - Alerts people and robots when the shit hits the fan
- **UI**
 - Runs the UI
 - Scheduling and result processing
 - Clustered for HA



Object Model - Checks

- **Active**
 - Hosts - a device
 - Services - something on a device
- **Virtual**
 - Clusters - a cluster of devices
 - Resources - a cluster of services
- **Passive**
 - Traps - something on a device



Object Model - Organisational

- Groups - arbitrary grouping of checks
- Locations - physical location of a host
- Categories - groups of checks
- Applications - grouping of application checks



Object Model - Misc

- Commands - check definitions
- Time Periods - when stuff can happen

- Contacts - people to be notified
- Teams - groups of people



Configuration

- XML based configuration, designed to be readable and compact
- Uses inheritance heavily, define core configuration once and inherit it
 - Hosts inherit Services and Traps from parent
- Aims to make templates easy, define a template once, use it for many times



Agents Everywhere



Bergamot Agent

- A host agent, like NRPE, executes checks on the actual server, eg: CPU usage
- Checks are not configured on the server, the agent is told what to do, less overhead
- A lot out of the box
 - CPU, Memory, Disk usage
 - Processes, Network Connections
 - Network and Disk IO



Bergamot Agent

- Heavily secured
 - Connects out using WebSocket to central hub
 - TLS certificates secure the server and the cluster
 - Each host identifier is in the certificate and signed
- Bergamot Agent Manager handles signing
 - As a separate service for security reasons
 - Can be stored on an isolated machine
 - Generates per site keys and certificates



The Crystal Ball



The Road Ahead

- More ideas than I have time for
 - Escalation and call rotas
 - CollectD support / metrics from Bergamot Agent
 - Metric trips - alert based on metric data
 - Periodic downtime
 - UI improvements
 - Easier to acknowledge alerts, add downtime
 - Config GUI editor
 - Dashboards and reporting