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Introducing a common interface to access AFS statistics

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2019 OpenAFS Workshop

AGENDA

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- Motivation
- Problem
- Solution
- StatsStore
- StatsStore and OpenAFS
- Other platforms
- Collectd
- Collectd and OpenAFS
- Links

MOTIVATION

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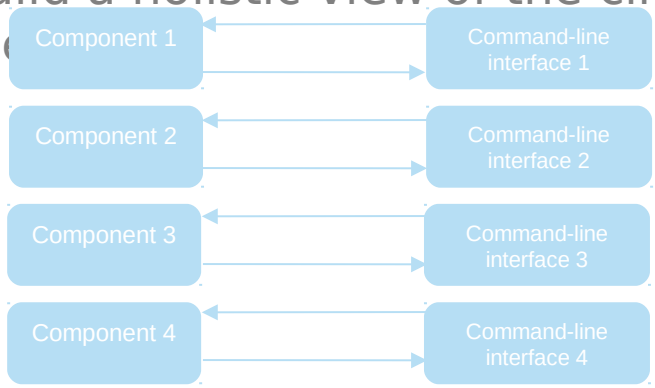
- Plenty of reasons why collecting stats about your system is a good idea;
  - Troubleshooting;
  - Tracking down bottlenecks;
  - Analyzing long-term trends;
  - Measure and monitor application performance;
  - Identify ways to optimize performance;
  - Others;

PROBLEM

- Different interfaces to get stats from different components of the system;
- Getting stats from one component of your system might not be enough;
  - Unable to correlate data from various applications;
  - Unable to connect events to certain system states;
- Difficulties to build a holistic view of the circumstances surrounding an e



PROBLEM

- Tracking data about the system as a whole could:
  - Bring together apparently disparate pieces of system data;
  - Help us understand what the environment looked like exactly at the time of the problem;
- See our system as a system, instead of as a loose set of unrelated components;
- Unfortunately, each component provides statistics in a different way;

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PROBLEM

SOLUTION

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- A common namespace to access performance data from a variety of system sources;
- Ideally, same command-line interface and API;
- A shared namespace across statistics enables you to easily explore all available information for a given system;

SOLUTION

Component 1
Component 2
Component 3
Component 4
Command-line interface

STATSSTORE

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- Introduced in Oracle Solaris 11.4;
- StatsStore unifies the broad set of Oracle Solaris observability technologies under one set of naming rules;
- This consolidated view of data is available through the interactive System Web Interface and through CLIs and APIs;

STATSSTORE

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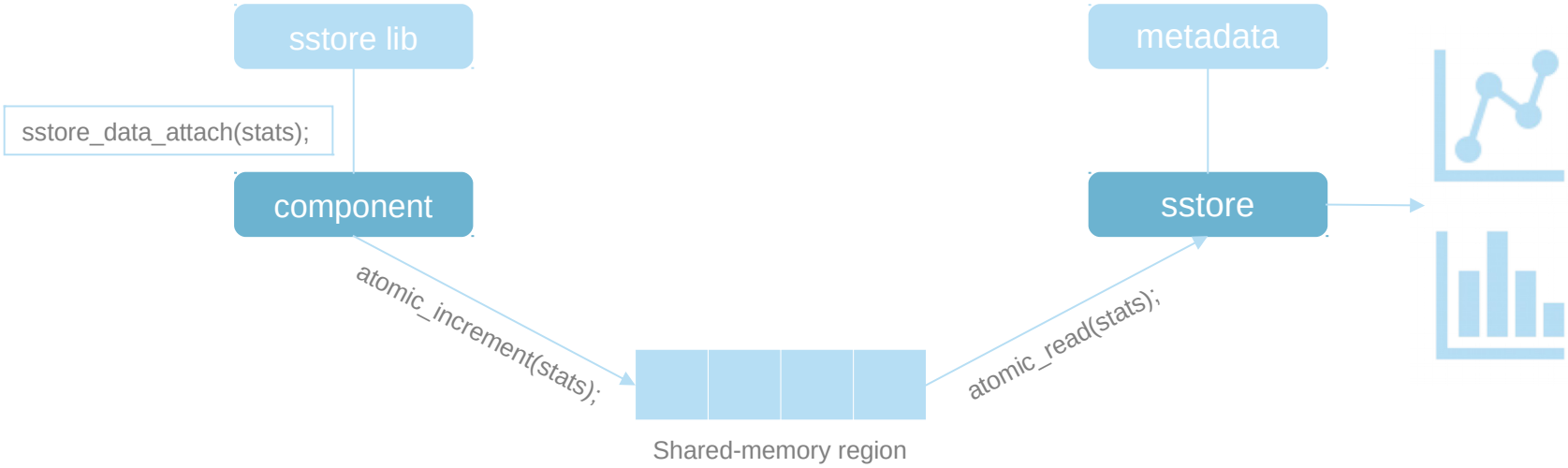
- Create metadata files that define your statistics;
- Modify your application to update values for the statistics that you created in metadata;
- Interfaces are available for both C and Python;
- Interface creates a shared memory region between sstored and the client process;
  - Supports only integer statistic values;
  - Values in this shared memory region are initialized to 0;
  - To update the statistics store, update the shared memory region array element for that statistic;

STATSSTORE


sstore lib
sstore_data_attach(stats);
component
metadata
sstore
atomic_increment(stats);
atomic_read(stats);
Shared-memory region

STATSSTORE AND OPENAFS

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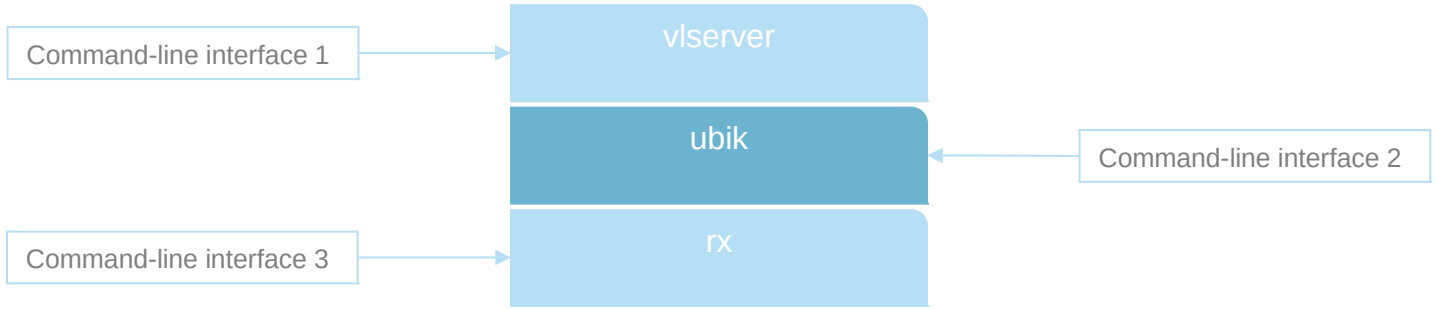
- Different ways to get statistics from different processes;
  - Different command-line interfaces;
  - Signals;
  - Fileserver, VL server, PT server, Volume server, etc.;
- Different ways to get statistics from the same process;



STATSSTORE AND OPENAFS

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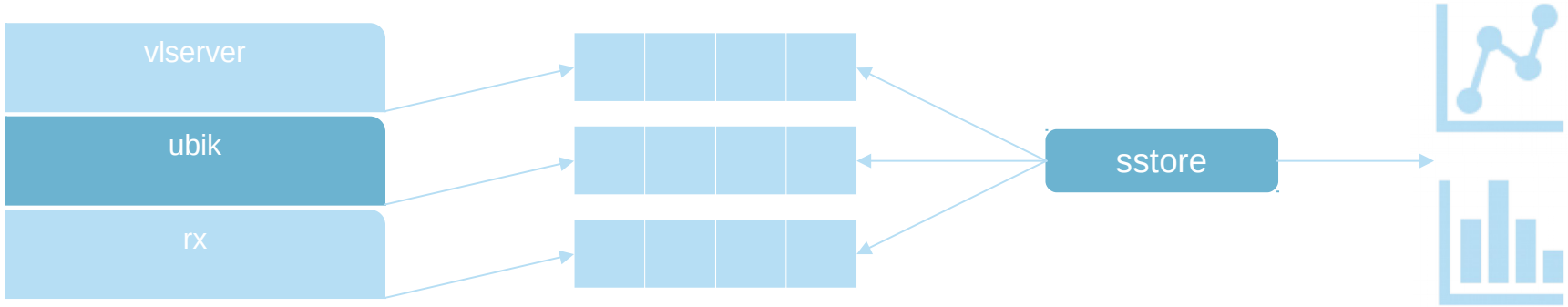
- Code refactoring:
  - Move related stats to the same struct;
  - Use stats store library to create shared memory region for each struct;
  - Update counters normally;



STATSSTORE AND OPENAFS

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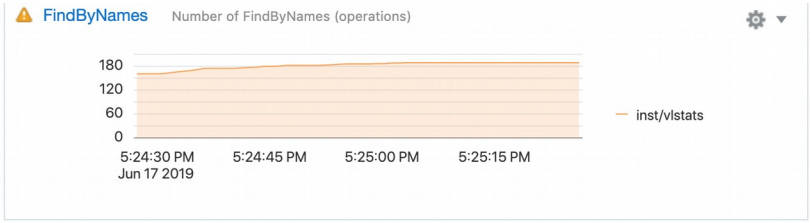

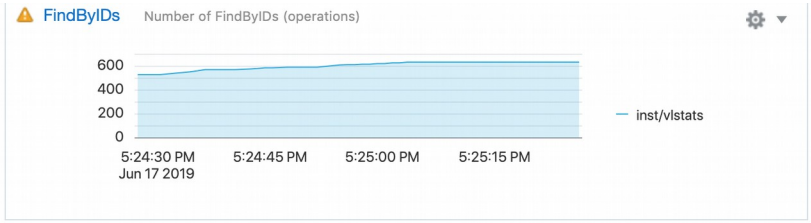

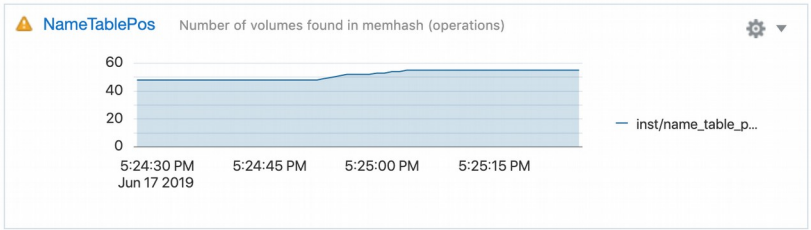

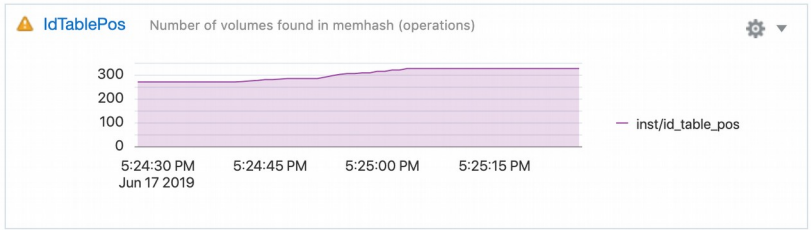

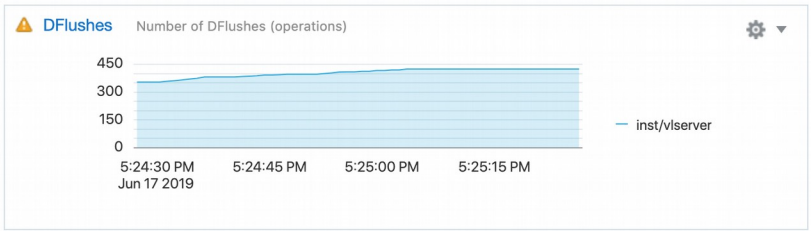

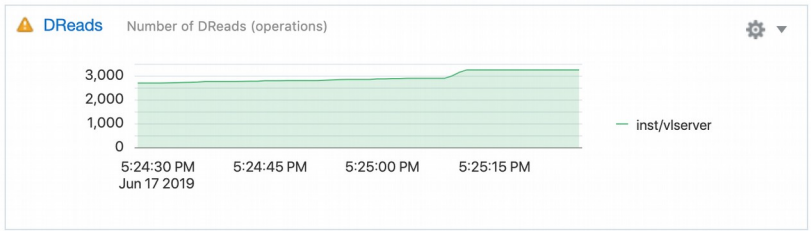

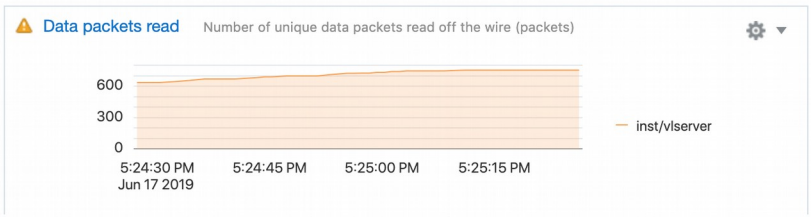

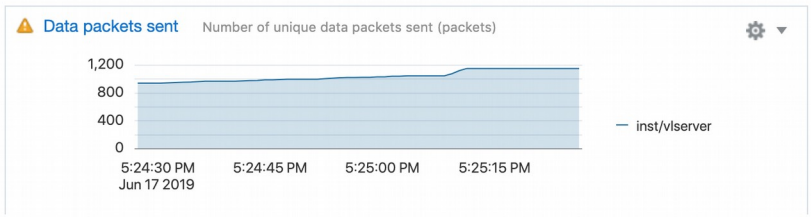

OTHER PLATFORMS

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- StatsStore is Solaris specific;
- Alternative for Linux;
  - Collectd;
- Collectd is an open source daemon that collects system and application performance metrics;
- Collects, transfers and stores system performance statistics;
  - Data acquisition and storage handled by plugins;

COLLECTD

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COLLECTD

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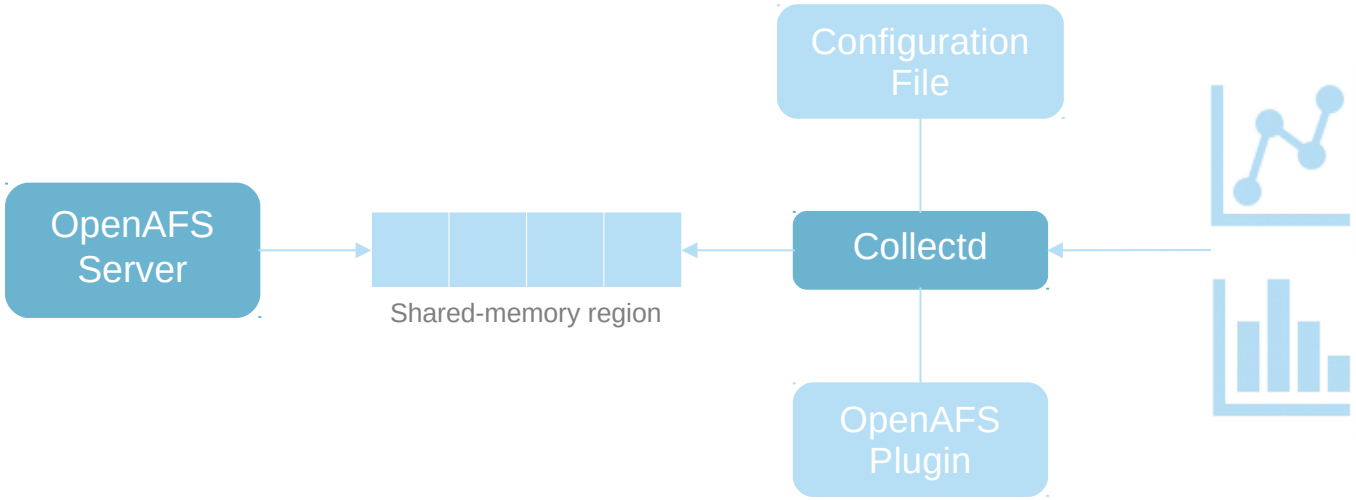
- Benefits:
  - Open source;
  - Extensible;
  - Free;
  - Lightweight;
  - Lots of plugins (over 130 plugins);
  - Widely supported (Linux, Mac OS X, AIX, FreeBSD, NetBSD, OpenBSD, etc.);
  - More;

COLLECTD

- Everything in collectd is done in plugins;
- Each plugin has their own unique settings;
- Plugin for OpenAFS developed;
  - Creates shared-memory region for each group of stats;
  - Group of stats specified in the configuration file;



COLLECTD AND OPENAFS

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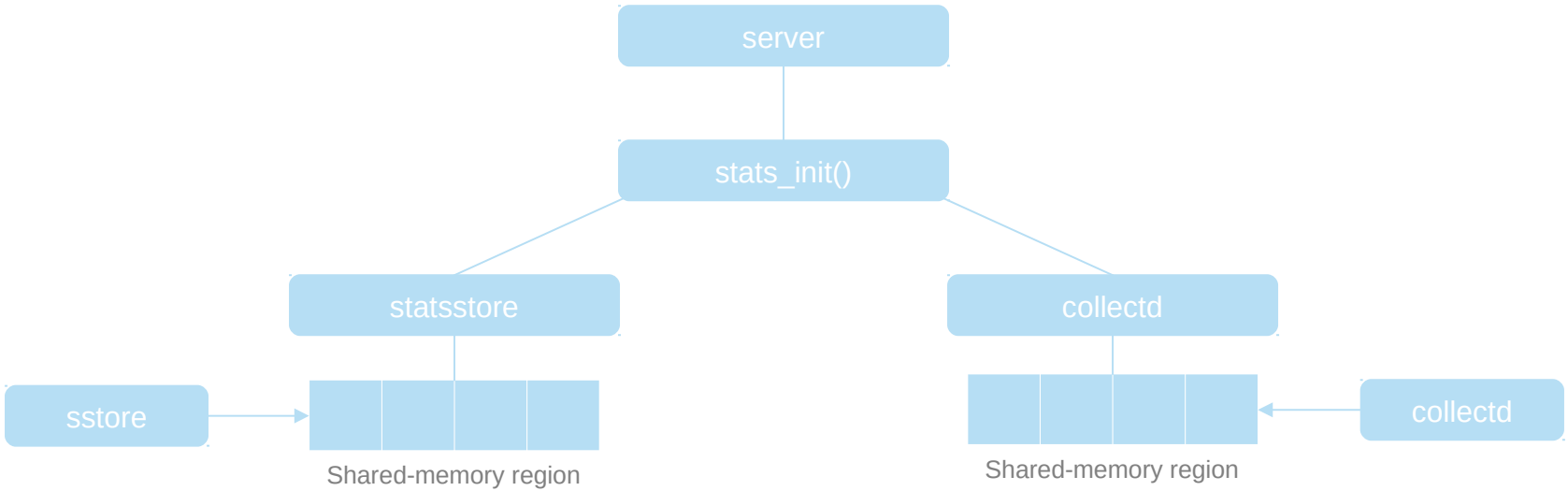
- OpenAFS uses the same interface used by StatsStore;
  - But with different implementation;
  - Collectd plugin: github.com/marciobarbosa/collectd/tree/mbarbosa/afs-stats-3



COLLECTD AND OPENAFS

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Thank you!