

# Using Components to Automate Performance Experiments



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# Motivation

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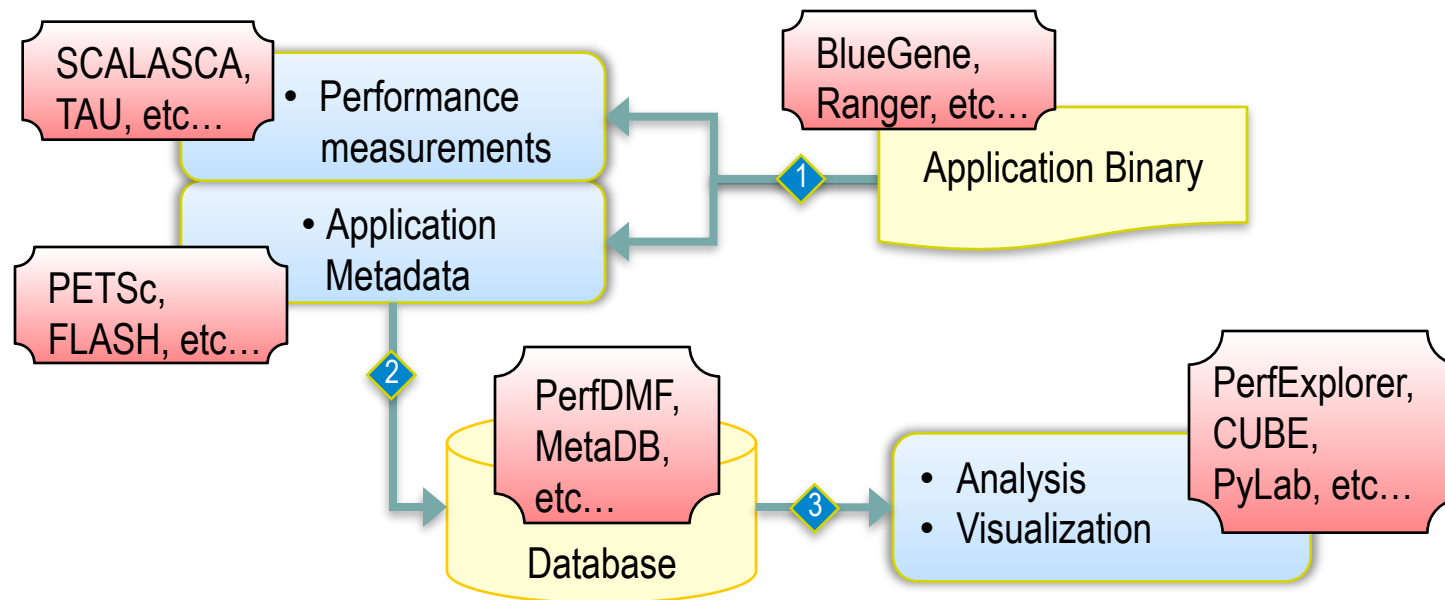
- CQoS requires support for
  - Performance measurement
  - Performance databases
  - Performance analysis
- Performance measurement can involve running thousand of experiments in different environments
  - The goal of this work is to automate performance experiments as much as possible using a component approach

# The Challenge

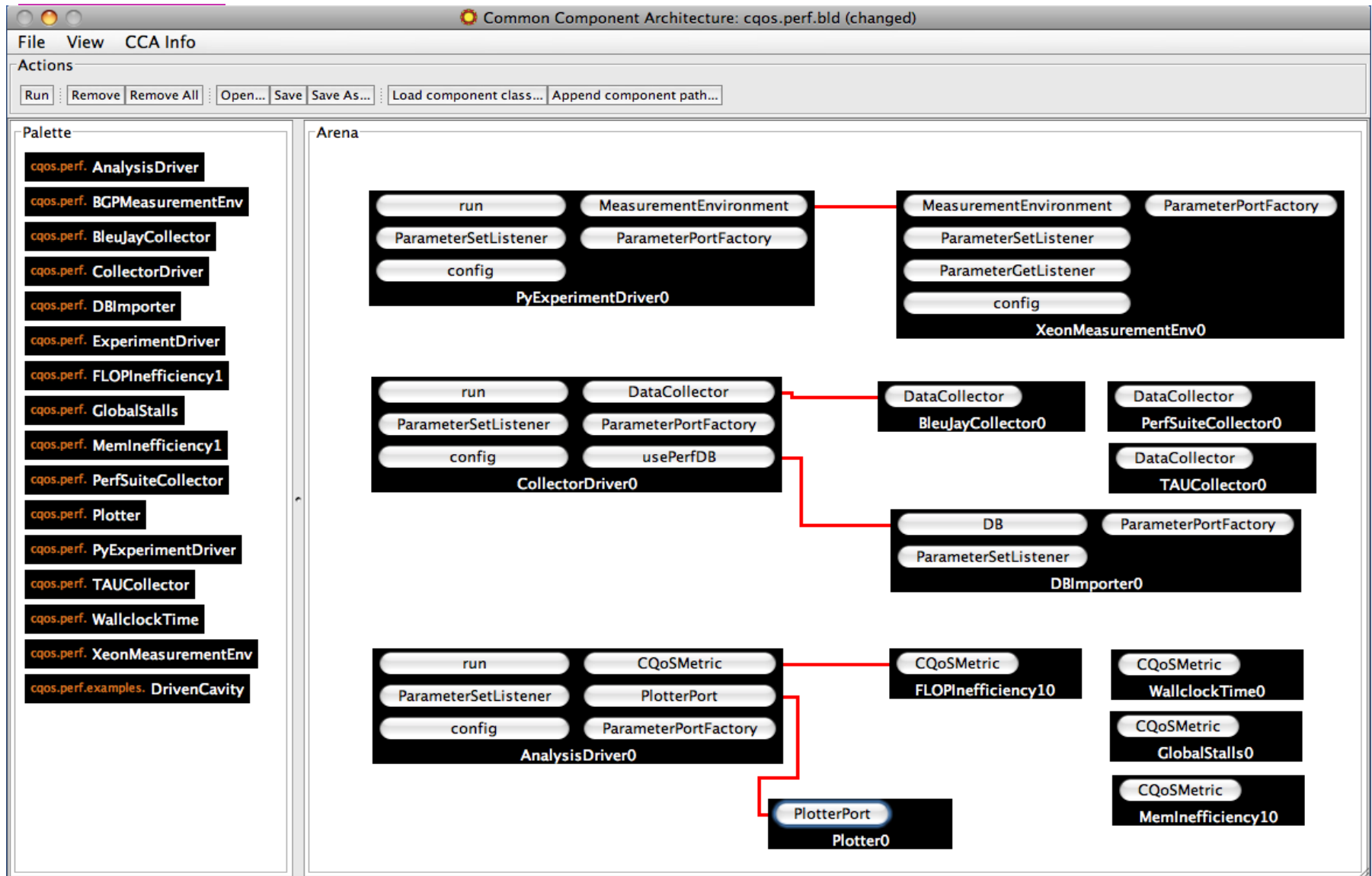
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- Performance experiments involve several variable configurations
  - Execution platform, programming model, application parameters, analysis tools and techniques
- Automation of each experimental phase
  - Experimental set-up and execution
  - Data collection and storage
  - Post-analysis

# Performance Experiment Workflow

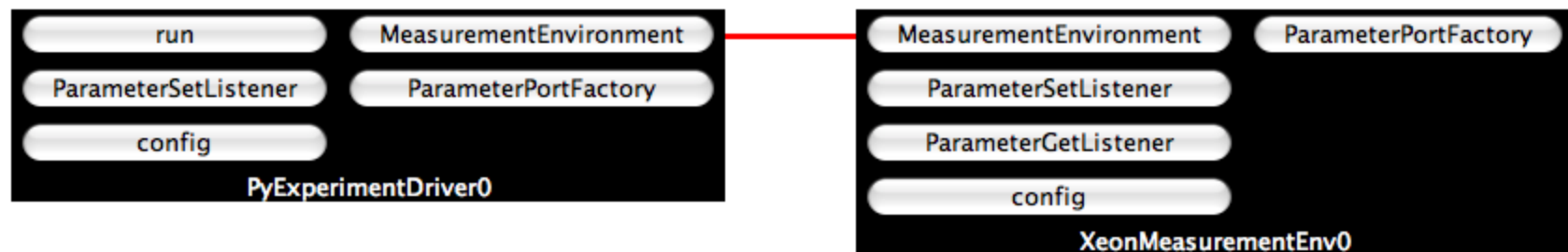


# Assembly of Components



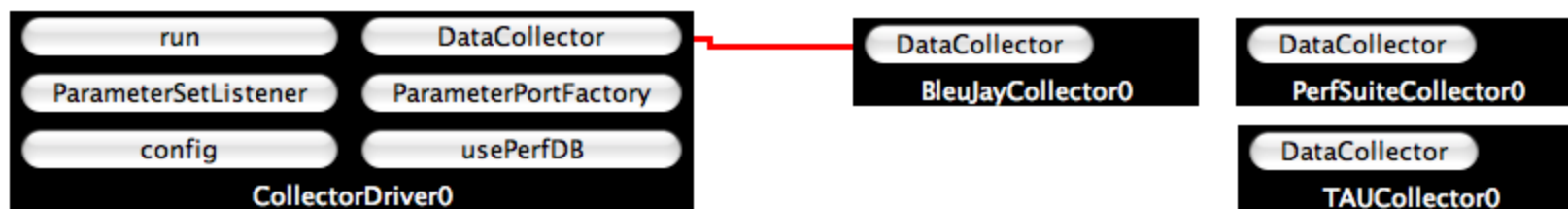
# Experiment Setup and Execution

- Set up measurement environment for platform
- Retrieve application configuration parameters
- Run the application



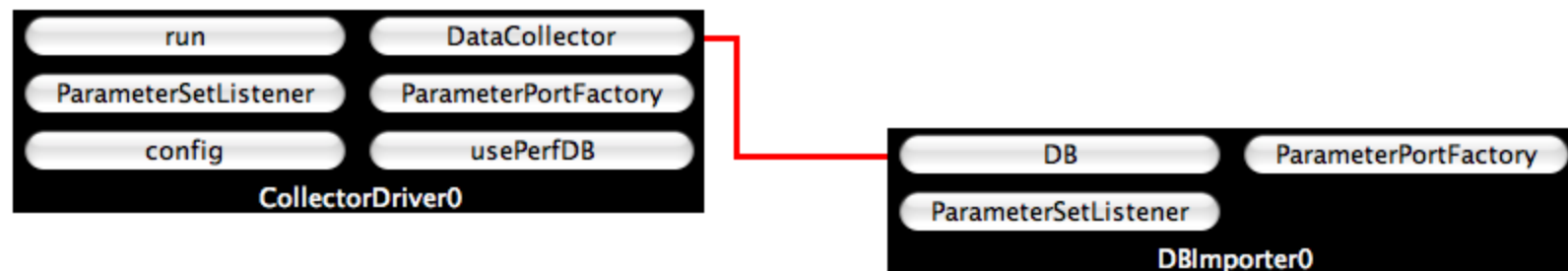
# Collection Phase

- Select the measurement tool and mode of collection
- Specify measurement technique and events to monitor



# Data Storage and Access

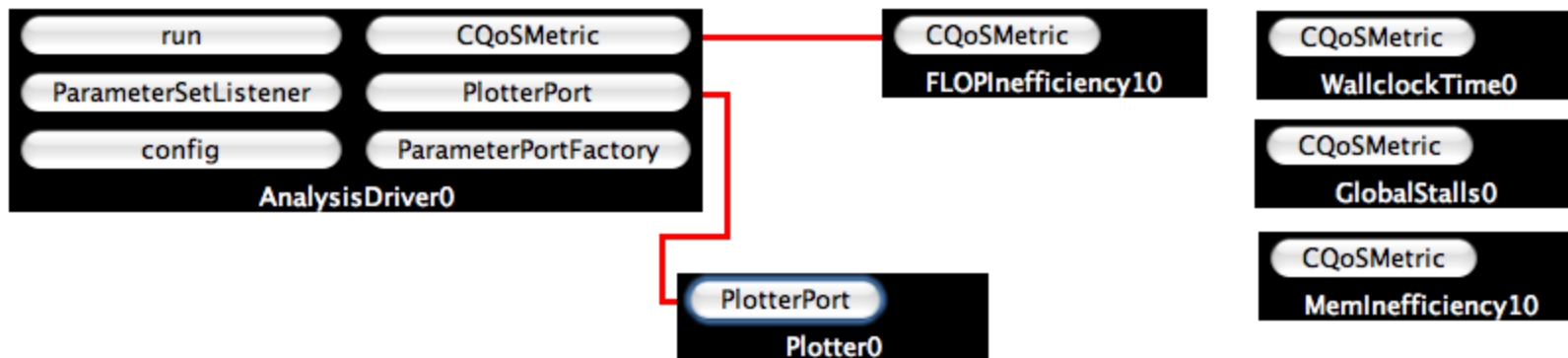
- Store metadata and performance data to database
- Retrieve data from database
- Specify set of trials to access



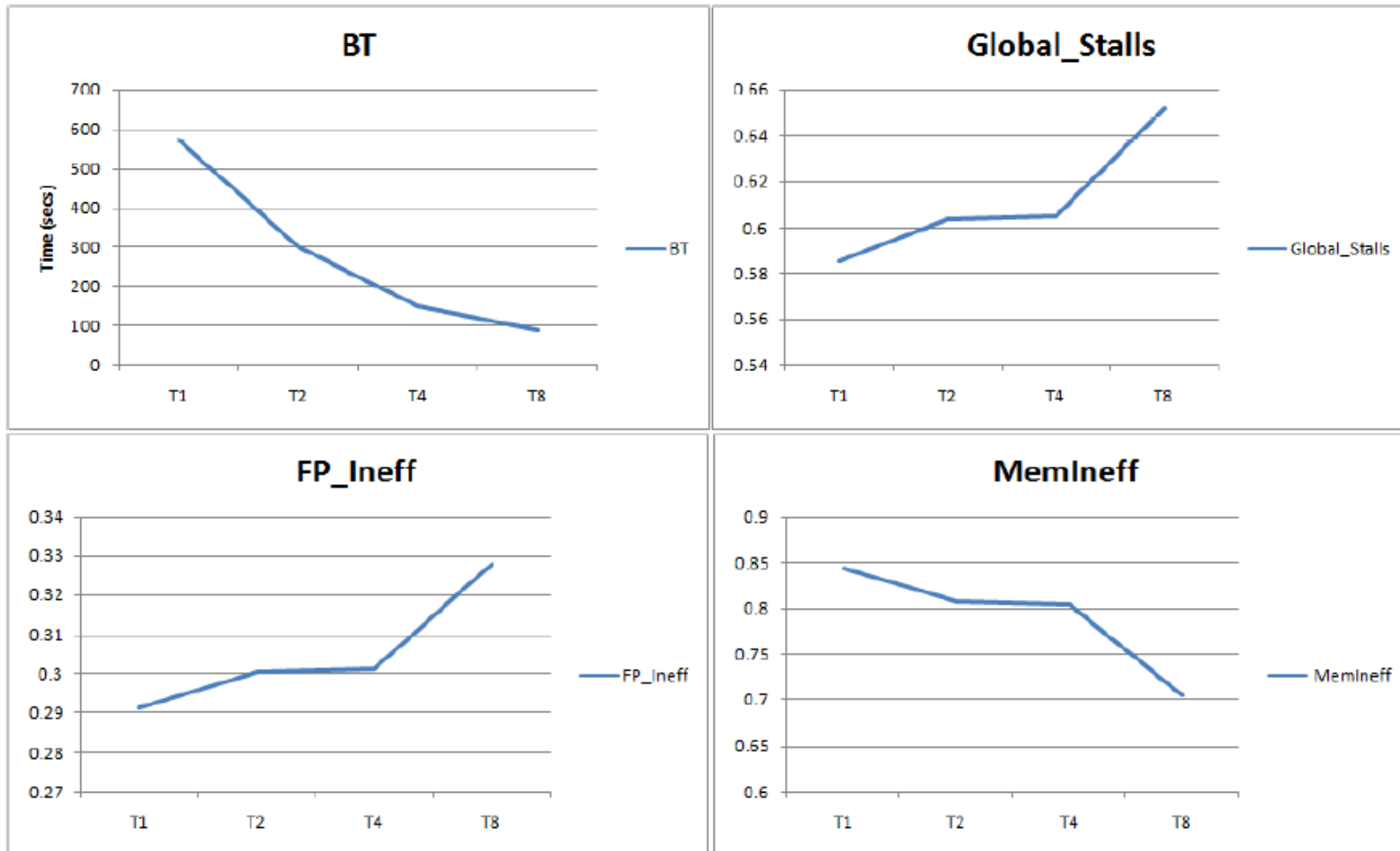


# Data Analysis Phase

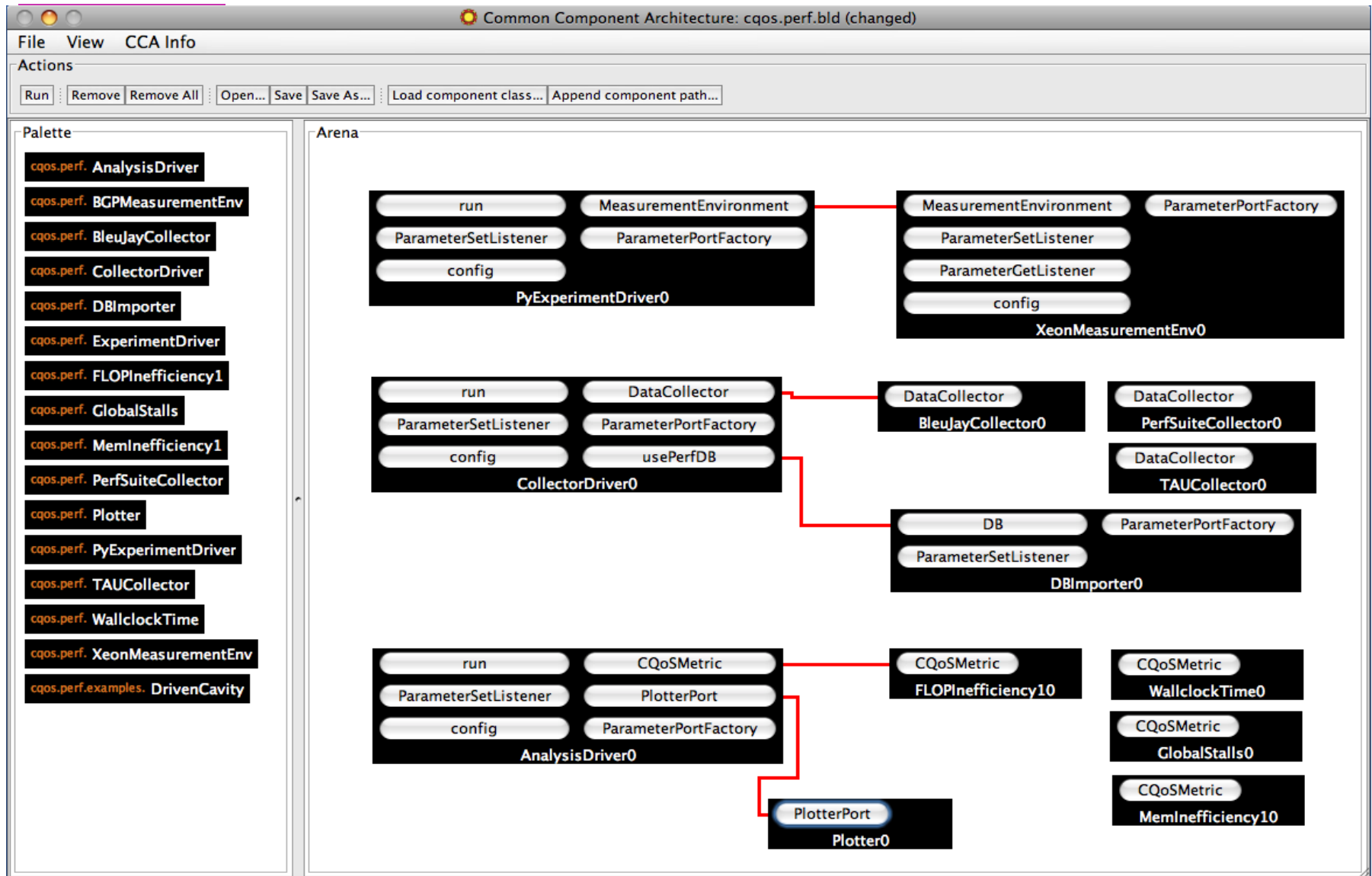
- Select type of analysis to perform
- Compute performance metrics
- Specify analysis for a given set of trials



# Sample Analysis Output



# Assembly of Components



# Summary

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- Develop components to automate process of running multiple performance experiments
- Provide a layer of abstraction for integrating support for multiple underlying tools and technology
- Improvements in efficiency in performance data collection for CQoS or performance tuning

# Future Work

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- Extensions to support...
  - Multiple platforms, application spaces, performance tools, database interfaces, and analysis techniques
- Generate script to run multiple experiments
- Charting results over multiple experiments

# Additional Information

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- Acknowledgments:
  - DOE SciDAC projects
    - Technology for Advanced Scientific Component Software (TASCS)
    - Performance Engineering Research Institute (PERI)
- Project website (same repository as other CQoS components)
  - <https://trac.mcs.anl.gov/projects/cca/wiki/cca>