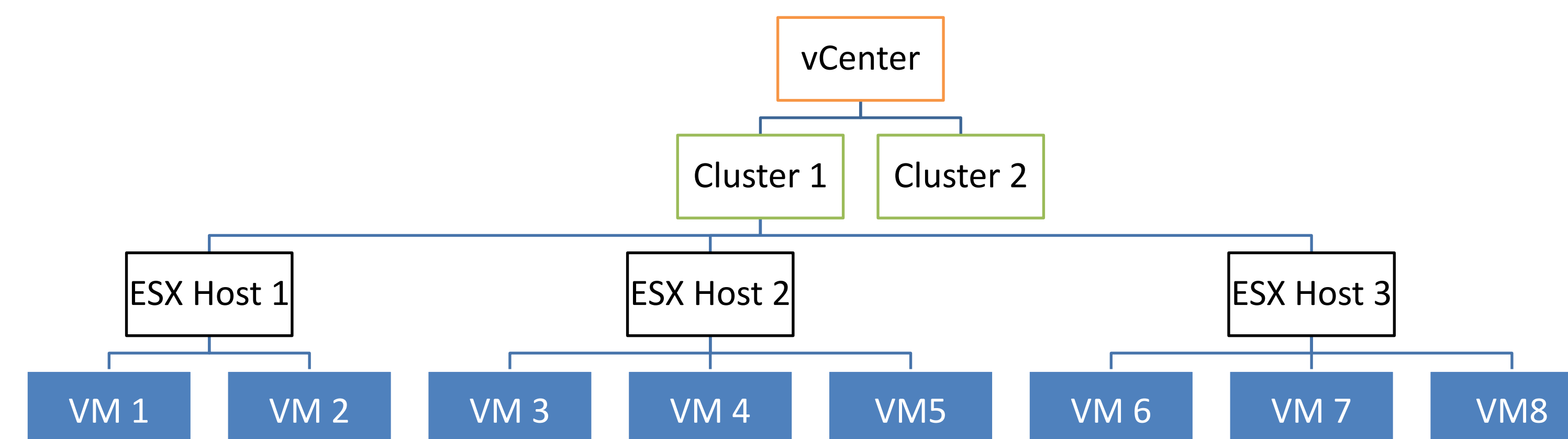




Project Overview

- Companies, with sufficient demand and resources, are operating their own data centers using VMware's *vSphere* to guarantee autonomy and reliability.
- VMware uses a *virtualization* hierarchy shown to the right.
- Tasks or *applications* run on virtual machines (*VMs*), each of which run an OS abstracting the ESX host's physical hardware.
- *VMs* can migrate between *ESX Hosts*, within their cluster, to evenly distribute work.
- This mapping problem can be reduced to a *vectorized bin-packing NP-Complete problem*.
- *Applications* use a variable amount of resources (*cpu, memory, network, disk*), these resources can often become over- or under-utilized which means inefficient resource allocation.

Virtualization Hierarchy



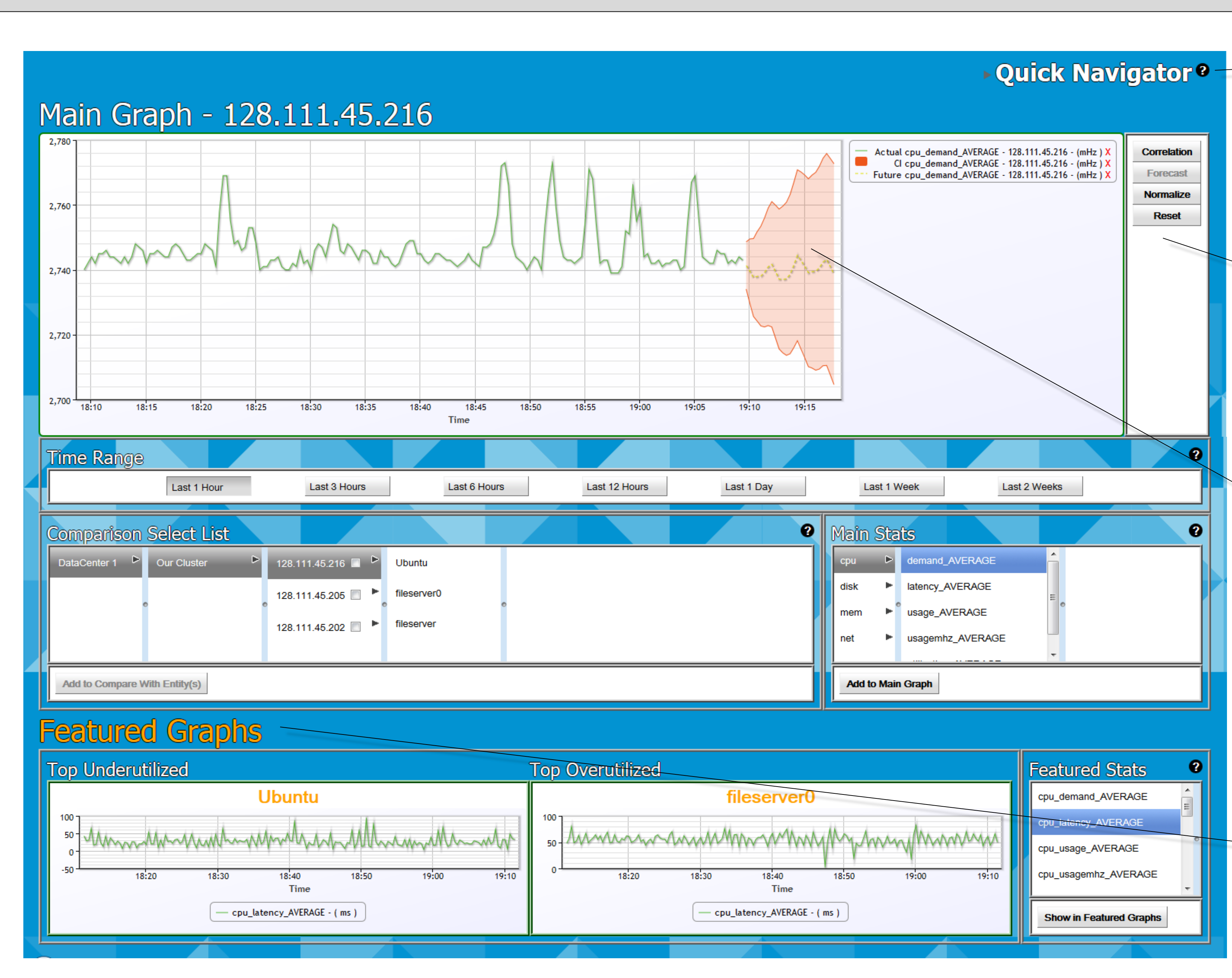
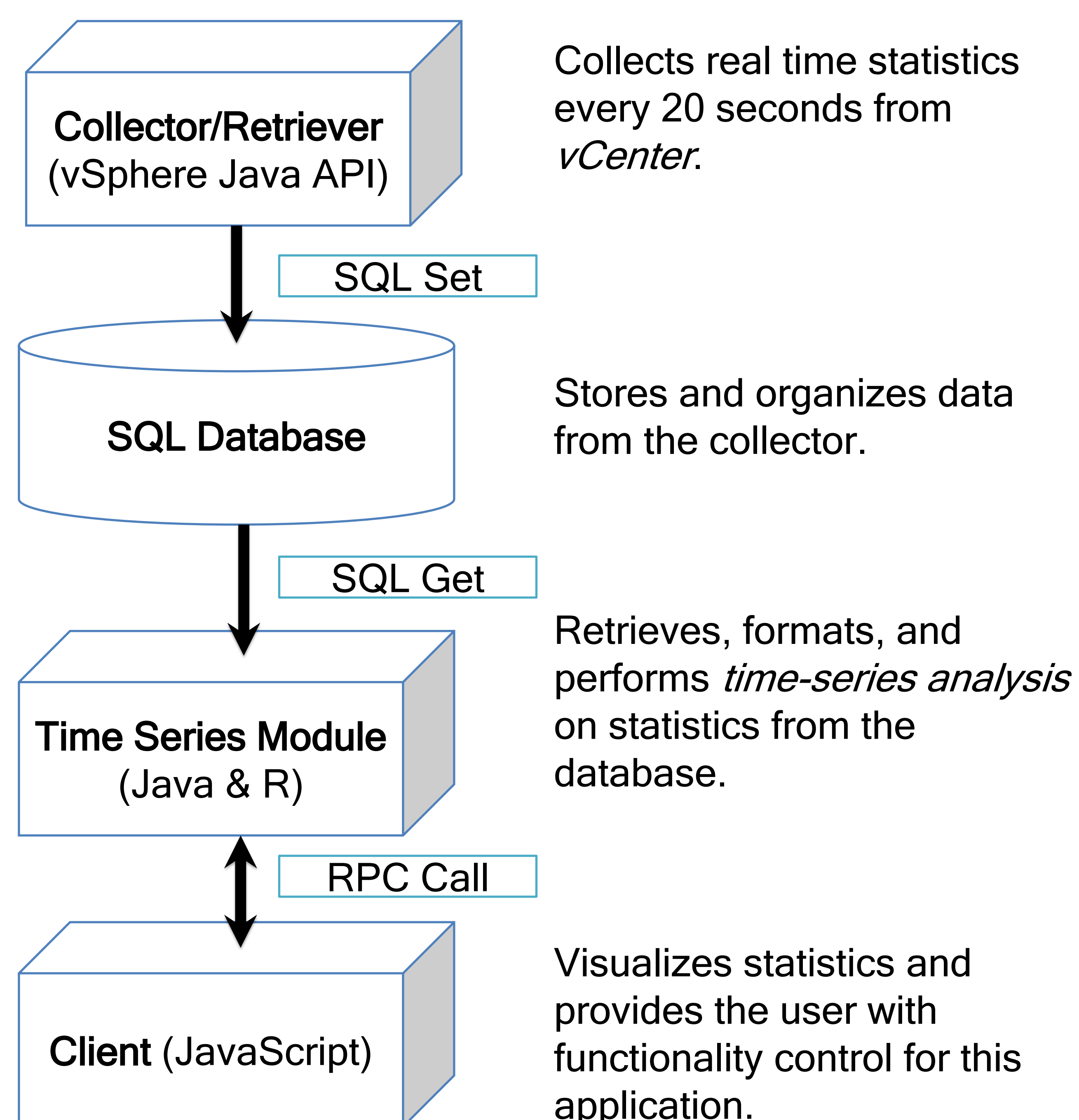
Instructors and Mentors



UCSB
Chandra Krintz
Tim Sherwood
Stratos Dimopoulos

VMware
Ajay Gulati
Banit Agrawal

Information Flow



Quickly navigate to different entities.

Perform *time-series analysis* using these buttons. Observe which statistics are correlated with one another. Forecast data using trends and seasonality. Normalize data to compare statistics across different units.

The most recent data to forecast with an 85% confidence interval. Less recent data has a smaller impact on the forecast.

Each application page contains quick access to information about the most over and underutilized sub-entities of an entity being analyzed.

Solution

- Having an efficient allocation of resources means lower costs and energy usage.
- We provide a simple and intuitive interface to view stats on the resource utilization of a datacenter, which allows network administrators to make informed resource scheduling decisions.
- We provide the tools necessary to compare various statistics across multiple entities with the option of correlation coefficients.
- We also provide functionality to do in-depth investigations and forecasts of individual entities.
- *Time-series analysis* has not been applied to VMware's software and our application offers an insightful exploitation of the information available.