



HPCViz: Monitoring Health Status of High Performance Computing Systems



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Outline

1. Introduction
2. Background and related work
3. Visualization architecture
4. Demo
5. Future work



Introduction



HPCC – Texas Tech University



Hewlett Packard Enterprise



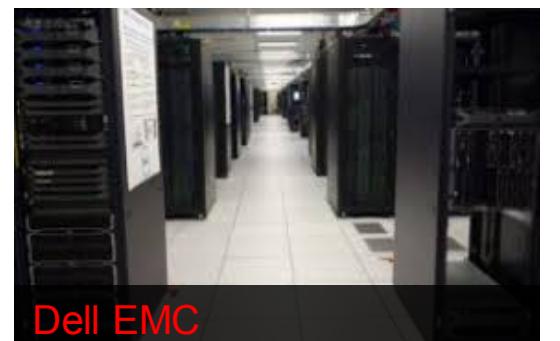
IBM.com



Intel.com



HPC - Southern California



Dell EMC



Project Overview

Monitoring data centers is challenging due to their size, complexity, and dynamic nature.

This project proposes visual approaches health service monitoring of HPC systems.

The visualization is expanded on the following dimensions:

- HPC spatial layout
- Temporal domain (historical vs. real-time tracking)
- System health services such as temperature, memory usage, fan speed, and power consumption.



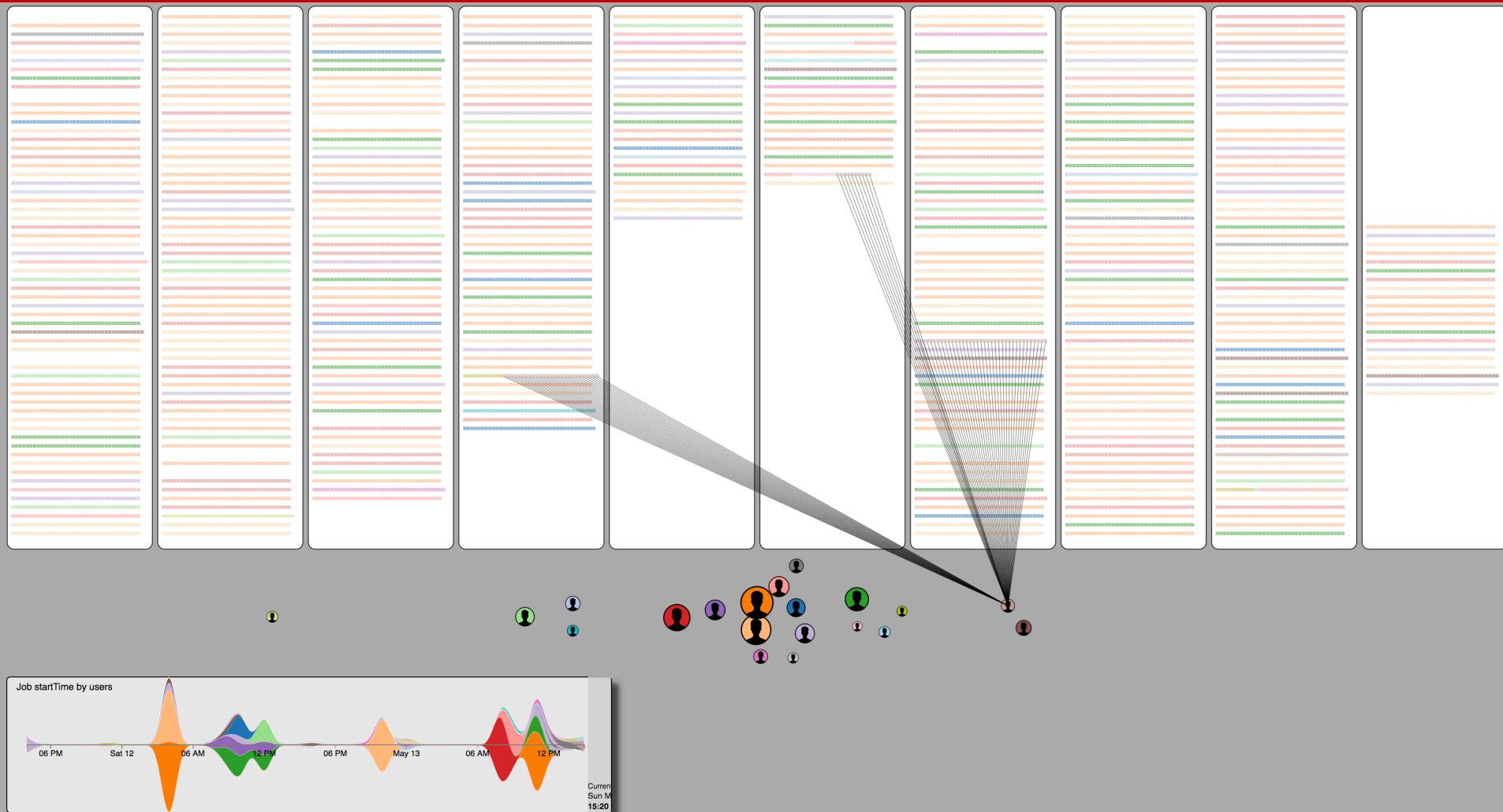
Project Overview

We therefore focus the following design goals:

- Provides spatial and temporal overview across hosts and racks,
- An interface that allows viewers to quickly narrow down features or event of interest
- Easy to switch and compare between different health status of HPC centers



HPCC spatial layout and job scheduling



Demo: <https://idatavisualizationlab.github.io/HPCC/scheduling/>



Background and Related Research

http://10.10.1.4/nagios/jsonquery.html

JSON Query Generator

B

Enter your options here.

CGI: Status JSON CGI
 service
 whitespace
 enumerate
 bitmask
 duration

Format Options

Date Format

Host Name: compute-1-1
Service Description: check temperature

A

```

{
  "format": "version": 0,
  "result": [
    {
      "query_time": 1537203440000,
      "cgi": "statusjson.cgi",
      "user": "nagiosadmin",
      "query": "service",
      "query_status": "released",
      "program_start": 1537159680000,
      "last_data_update": 1537203438000,
      "type_code": 0,
      "type_text": "Success",
      "message": ""
    }
  ]
}

```

C

Current Network Status
Last Updated: Mon Sep 17 11:45:48 CDT 2018
Updated every 90 seconds
Nagios® Core™ 4.4.0 - www.nagios.org
Logged in as nagiosadmin

[View Service Status Detail For All Host Groups](#)
[View Status Overview For All Host Groups](#)
[View Status Summary For All Host Groups](#)
[View Status Grid For All Host Groups](#)

Up	Down	Unreachable	Pending
462	5	0	0
All Problems		All Types	
5		467	

Ok	Warning	Unknown	Critical	Pending
3132	93	43	1	0
All Problems		All Types		
137		3269		

Host Status Details For All Host Groups

Limit Results: 100

[«](#) [«](#) [1](#) [2](#) [3](#) [4](#) [5](#) [»](#) [»»](#)
Results 0 - 100 of 467 Matching Hosts

Host	Status	Last Check	Duration	Status Information
compute-1-1	UP	09-17-2018 11:38:30	0d 11h 59m 20s	OK - Host working correctly!
compute-1-10	UP	09-17-2018 11:37:30	0d 4h 20m 10s	OK - Host working correctly!
compute-1-11	UP	09-17-2018 11:37:31	0d 11h 59m 11s	OK - Host working correctly!
compute-1-12	UP	09-17-2018 11:31:46	0d 11h 59m 26s	WARNING - Host working, but needs attention!
compute-1-13	UP	09-17-2018 11:29:54	0d 11h 59m 7s	OK - Host working correctly!
compute-1-14	UP	09-17-2018 11:44:49	0d 11h 59m 4s	OK - Host working correctly!
compute-1-15	UP	09-17-2018 11:44:42	0d 0h 1m 5s	WARNING - Host working, but needs attention!
compute-1-16	UP	09-17-2018 11:44:52	0d 11h 59m 2s	OK - Host working correctly!
compute-1-17	UP	09-17-2018 11:44:12	0d 11h 59m 36s	OK - Host working correctly!
compute-1-18	UP	09-17-2018 11:20:53	0d 11h 58m 59s	OK - Host working correctly!
compute-1-19	UP	09-17-2018 11:44:18	0d 7h 17m 27s	OK - Host working correctly!
compute-1-2	UP	09-17-2018 11:44:50	0d 11h 59m 3s	OK - Host working correctly!
compute-1-20	UP	09-17-2018 11:45:08	0d 4h 59m 21s	OK - Host working correctly!

(a)



An initial interface has been developed

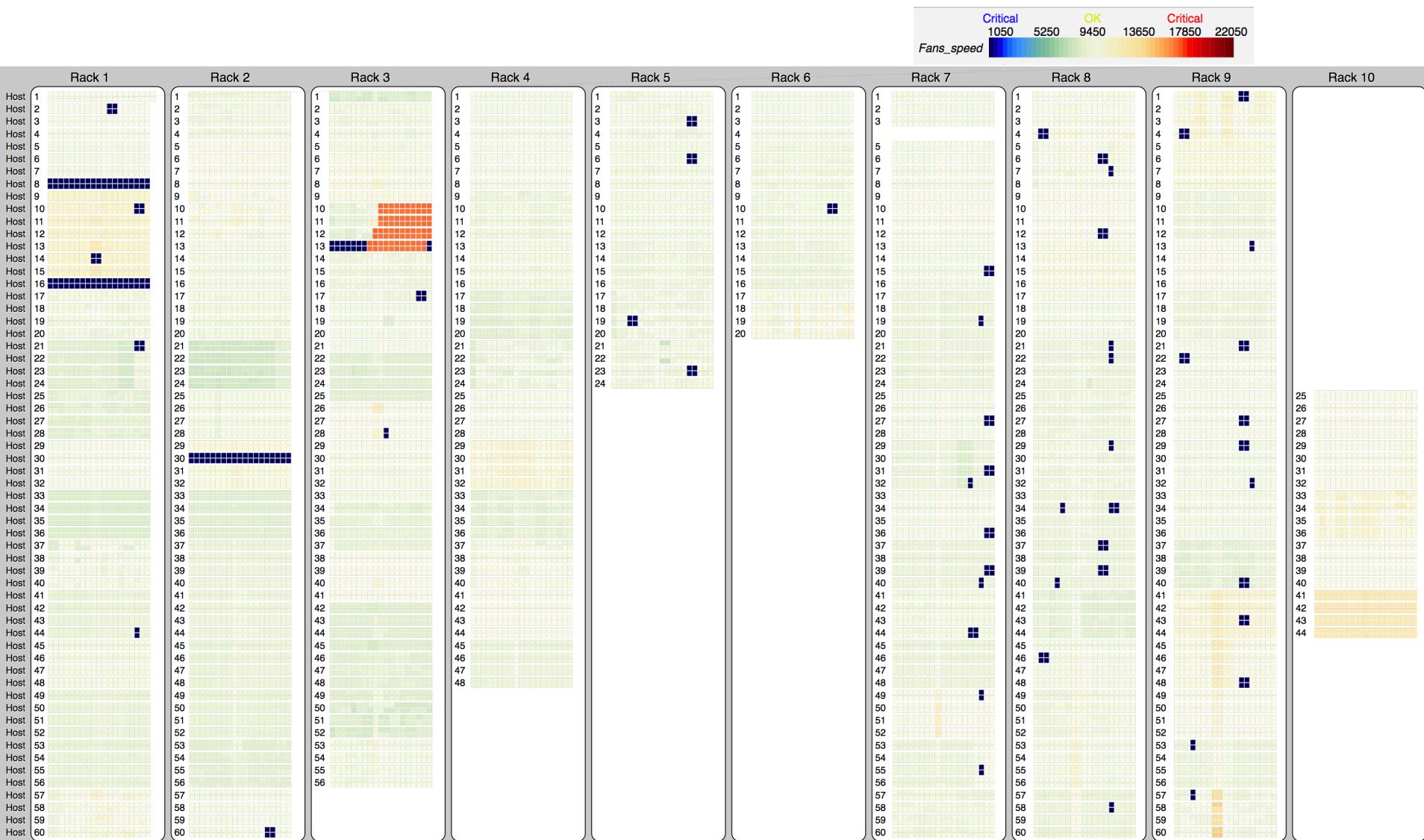


HPCC on Sep, 26 2018: CPU temperature





HPCC on Sep, 26 2018: Fan speed





Demos

HiperView:

- <https://idatavisualizationlab.github.io/HPCC/HiperView/demo.html>
- <https://idatavisualizationlab.github.io/HPCC/HiperOverheatSep26/demo.html>

Github repository:

- <https://github.com/iDataVisualizationLab/HPCC>

Outlier detection:

- <https://outliagnostics.github.io/demos.html>



Ongoing Work

The current prototype is very different from what we have in the paper

Questions?



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