

NSF/IUCRC CAC PROJECT

INTEGRATED VISUALIZING, MONITORING, AND MANAGING HPC SYSTEMS

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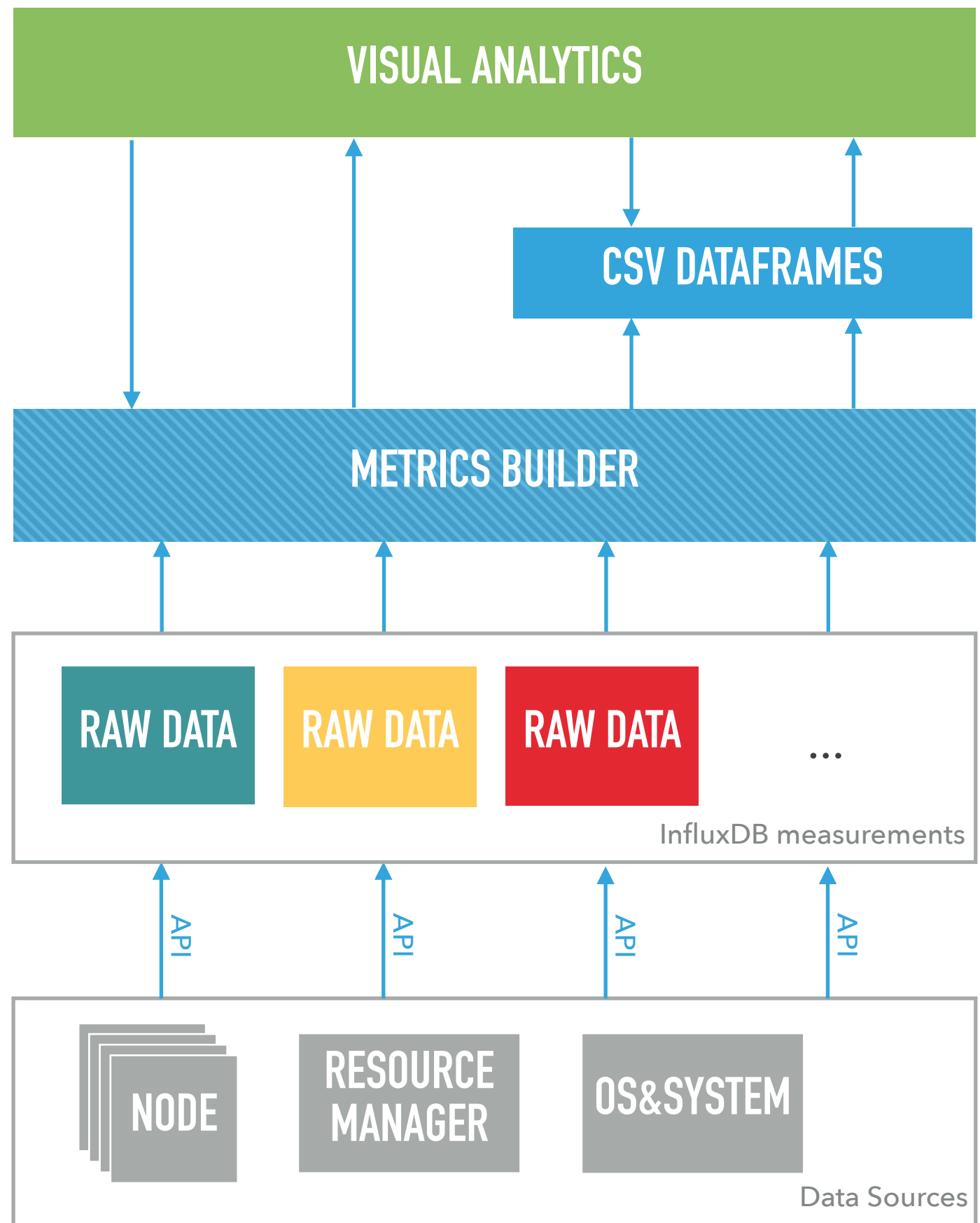
Dr. Yong Chen, Associate Professor, CS Dept, TTU

Dr. Tommy Dang, Assistant Professor, CS Dept, TTU

- MetricsBuilder overview
- Database dependence
- Selection of nodes and metrics

METRICS BUILDER OVERVIEW

- Acts as the **middleware** between the database and the visual analytics
- **Speeds up** the retrieval of monitoring data:
 - Concurrent processing etc. (**25x**)
 - Transfer compressed data (**2x**)
- Provides end-users with the **ability to select** target metrics and nodes (in the “filter” branch)
- Needs to **understand** the database schemas and the data formats required for visual analytics



DATABASE SCHEMA

- Measurements (tables) are named after the data sources, i.e. **metrics from the same data source are saved in the same measurement**:
 - “CPU1Temp”, “CPU2Temp”, “FAN_1”, “FAN_2”, “FAN_3”, “FAN_4” are in measurement “**Thermal**”
 - “NodePower” is in measurement “**Power**”
 - “CPUUsage”, “MemUsage” are in measurement “**UGE**”
- Job information is stored in measurement: “**JobsInfo**”. The relationship between Node and jobs is stored in “**NodeJobs**”
- Tag metrics with “NodeId” and “Label”
- <https://github.com/nsfcac/MetricsBuilder/blob/master/tools/schema.yml>

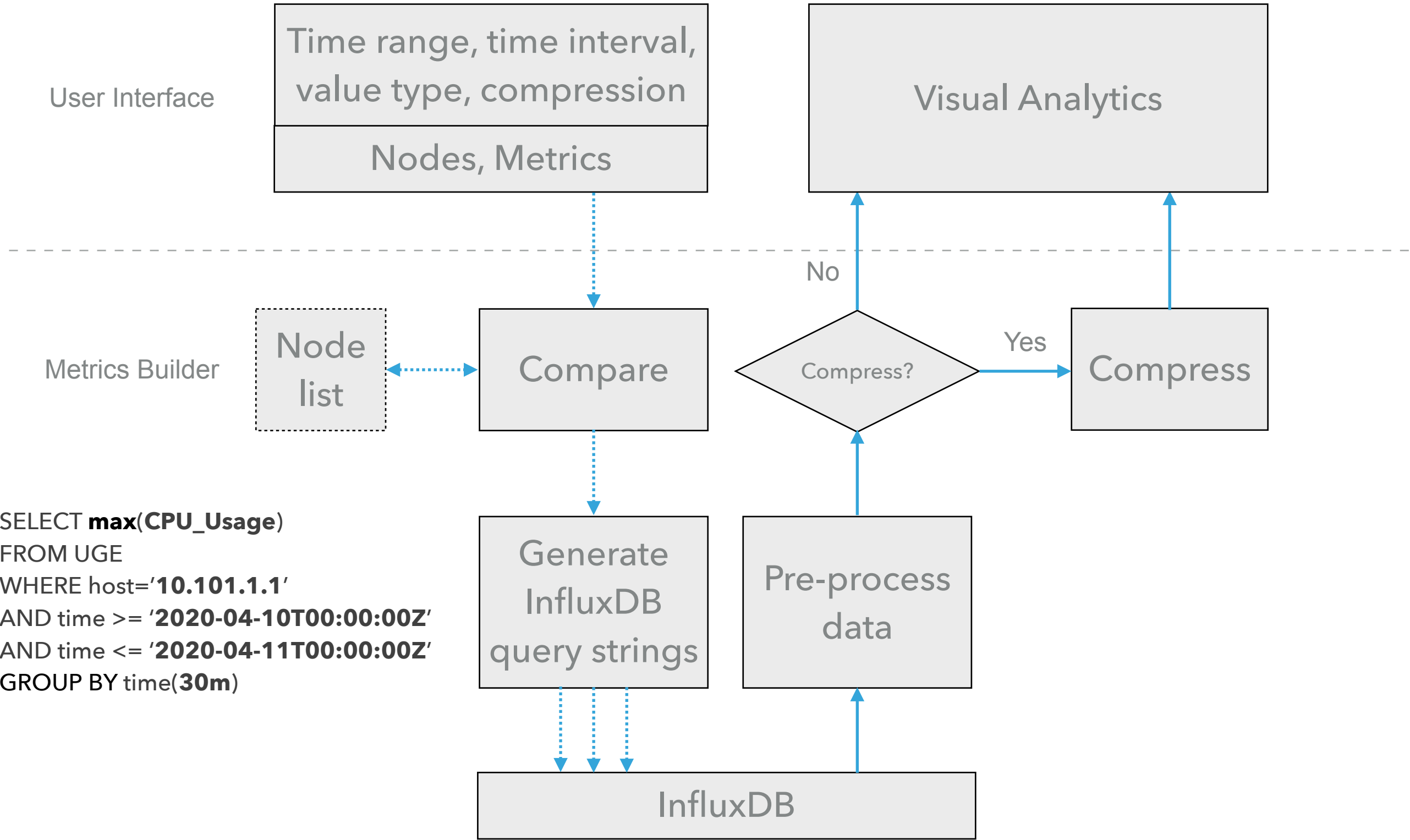
```
"time": 1583792296,  
"measurement": "Thermal",  
"tags":  
    "NodeId": "101.10.1.1"  
    "Label": "FAN_1",  
"fields":  
    "Reading": 9310
```

```
"time": 1583792296,  
"measurement": "NodeJobs",  
"tags":  
    "NodeId": "101.10.1.1"  
"fields":  
    "JobList": "[123456,  
                123457]"
```

DATA FORMAT REQUIRED FOR VISUAL ANALYTICS

- Feeds visual analytics with **JSON** formatted data (dataframe can be easily built from JSON data)
- The metric readings for each time step are stored in an array
 - “memory_usage”: [0.45, 0.50, 0.50, 0.65, 0.80]
- **Aggregate** metrics in the same category into an array
 - “cpu_inl_temp”: [[CPU1Temp, CPU2Temp, InletTemp], ...]
 - “fan_speed”: [[FAN_1, FAN_2, FAN_3, FAN_4], ...]
- <https://github.com/nsfcac/MetricsBuilder/blob/master/openapi.yaml>

METRICS BUILDER MECHANISM





QUESTIONS?/COMMENTS?