Monitoring Data Quality with Asset Analytics

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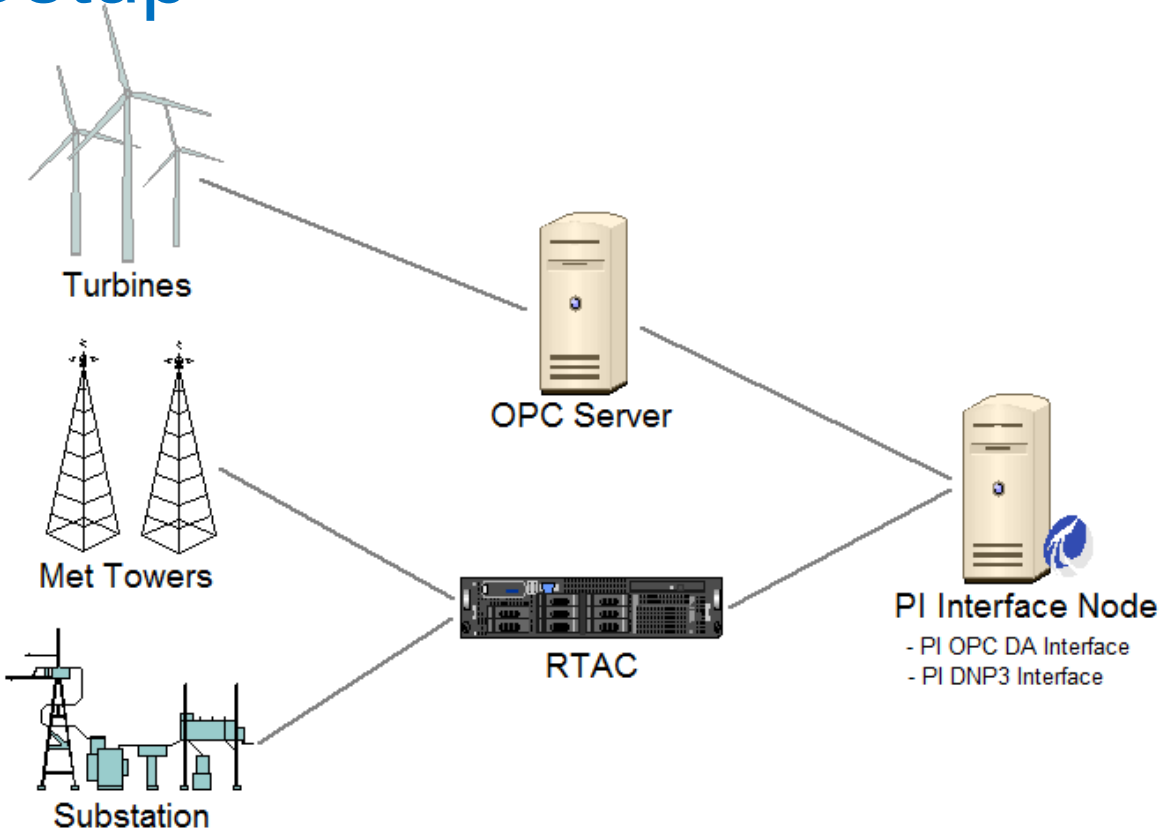
What We're Covering

- Our Assets and PI System setup
- Data flow challenges
- Asset-level Monitoring
- Site-level monitoring and reporting
- Results and next steps

Our Setup

- ~30 sites
- ~100 turbines per site on average
- PI node at each site with OPC and DNP3 interfaces
- Turbine data collected via OPC interface
- Substation and Met Tower via DNP3 interface
- PI nodes buffer to a central collective

Our Setup



Data Quality Challenges

- OPC server failures
  - Bad values such as “Comm Fail”, “I/O Timeout”
  - Stale data
  - Repeating value
  - Can affect all or only some turbines
- RTAC failures
- Met tower faults or sensor failures
- Network lag

Our Needs

- Robust asset-level calculations to discern data interruptions
- Smart reporting that will bring issues to our attention without overwhelming
- Track performance to determine where to focus improvement efforts

Common Approaches in Analytics

- BadVal()

  Returns true if a given value or function is Bad

- StDev()

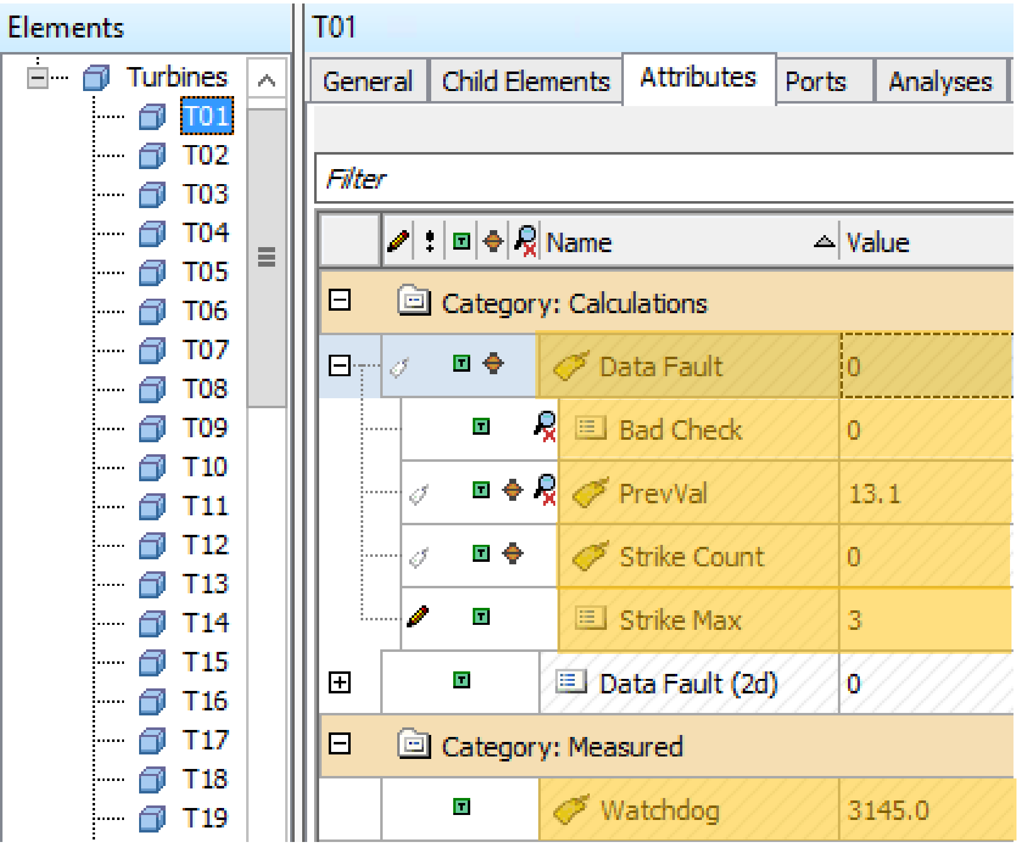
  Takes the standard deviation of a given attribute over a specified time range

- HasChanged()

  Returns true if a given attribute has updated over a specified time range

- Event Count()

  Returns the number of events for an attribute over a specified time range



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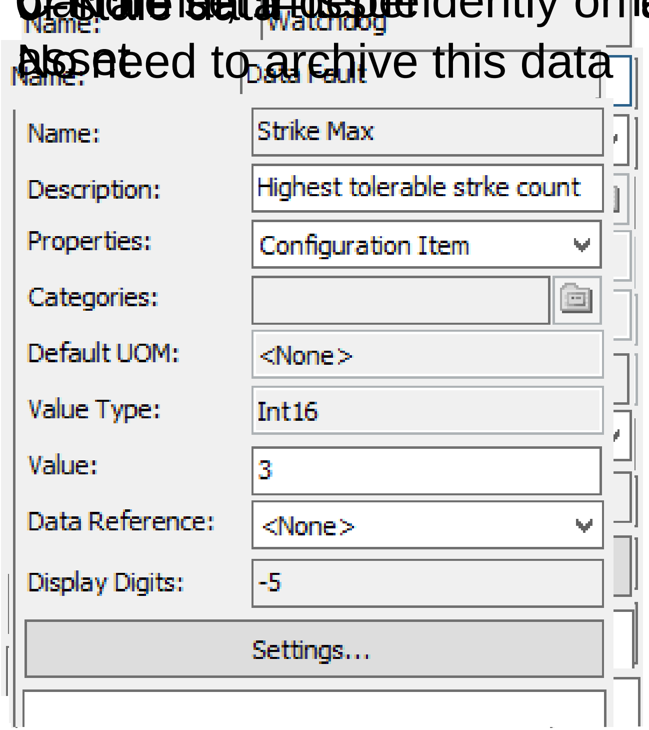
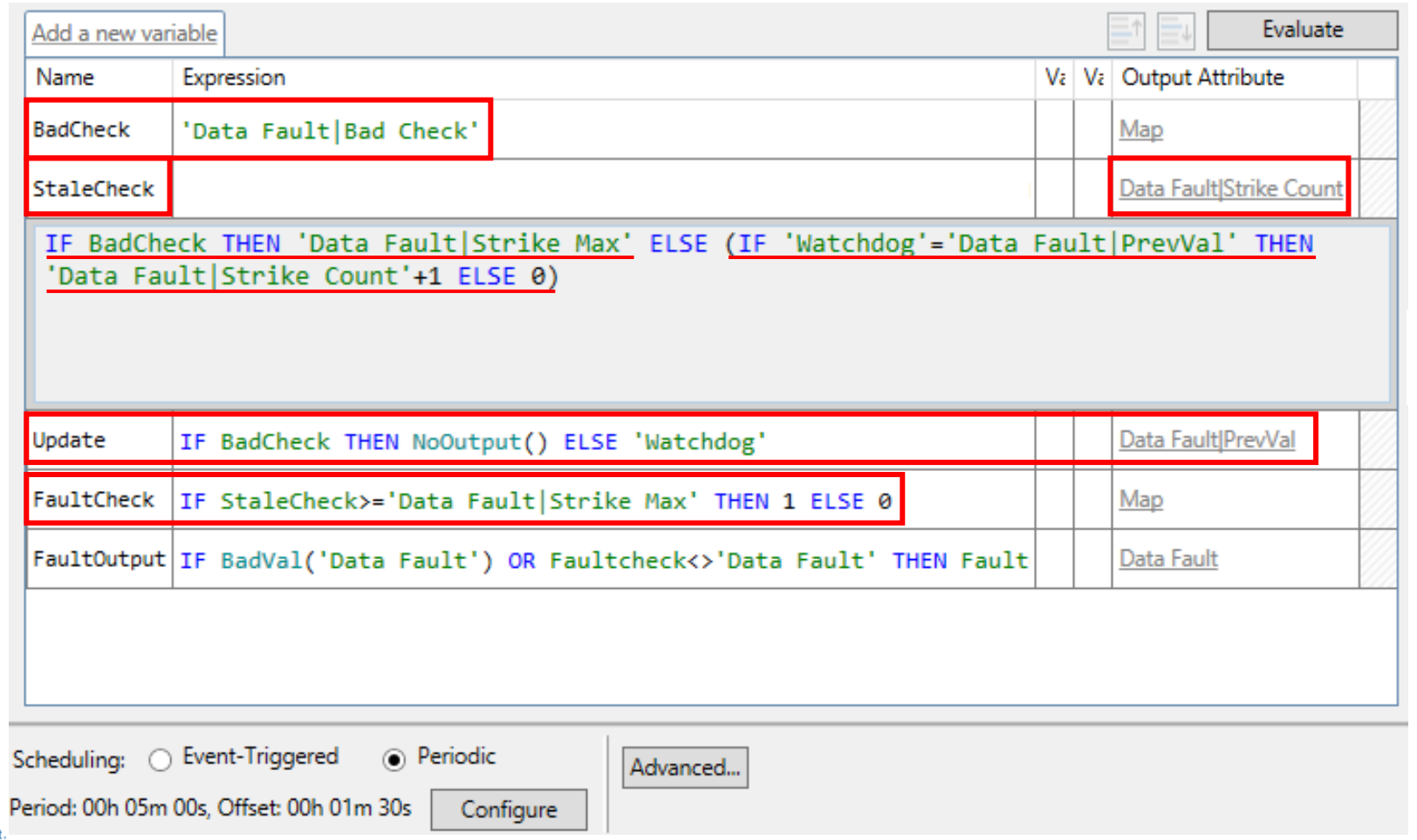
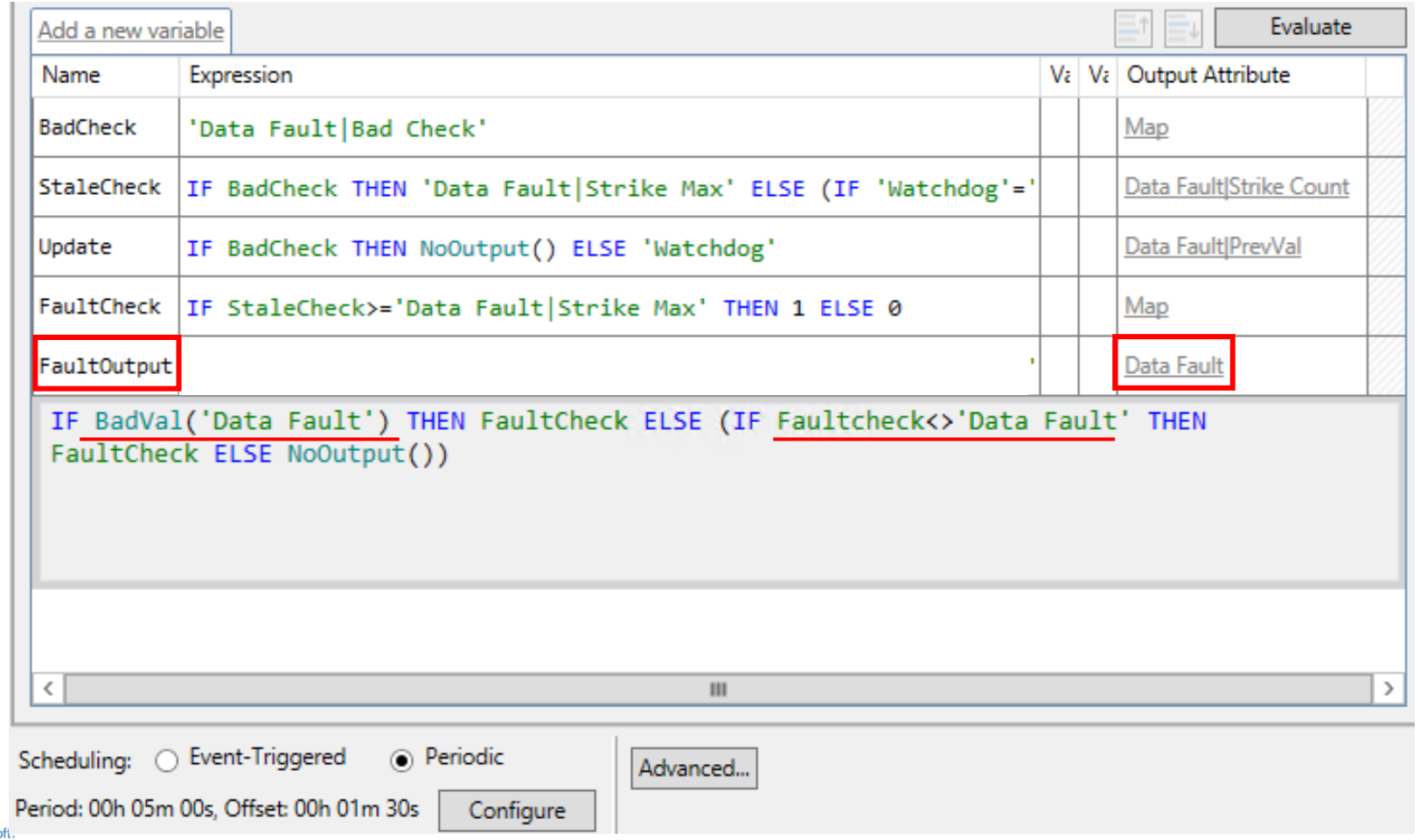
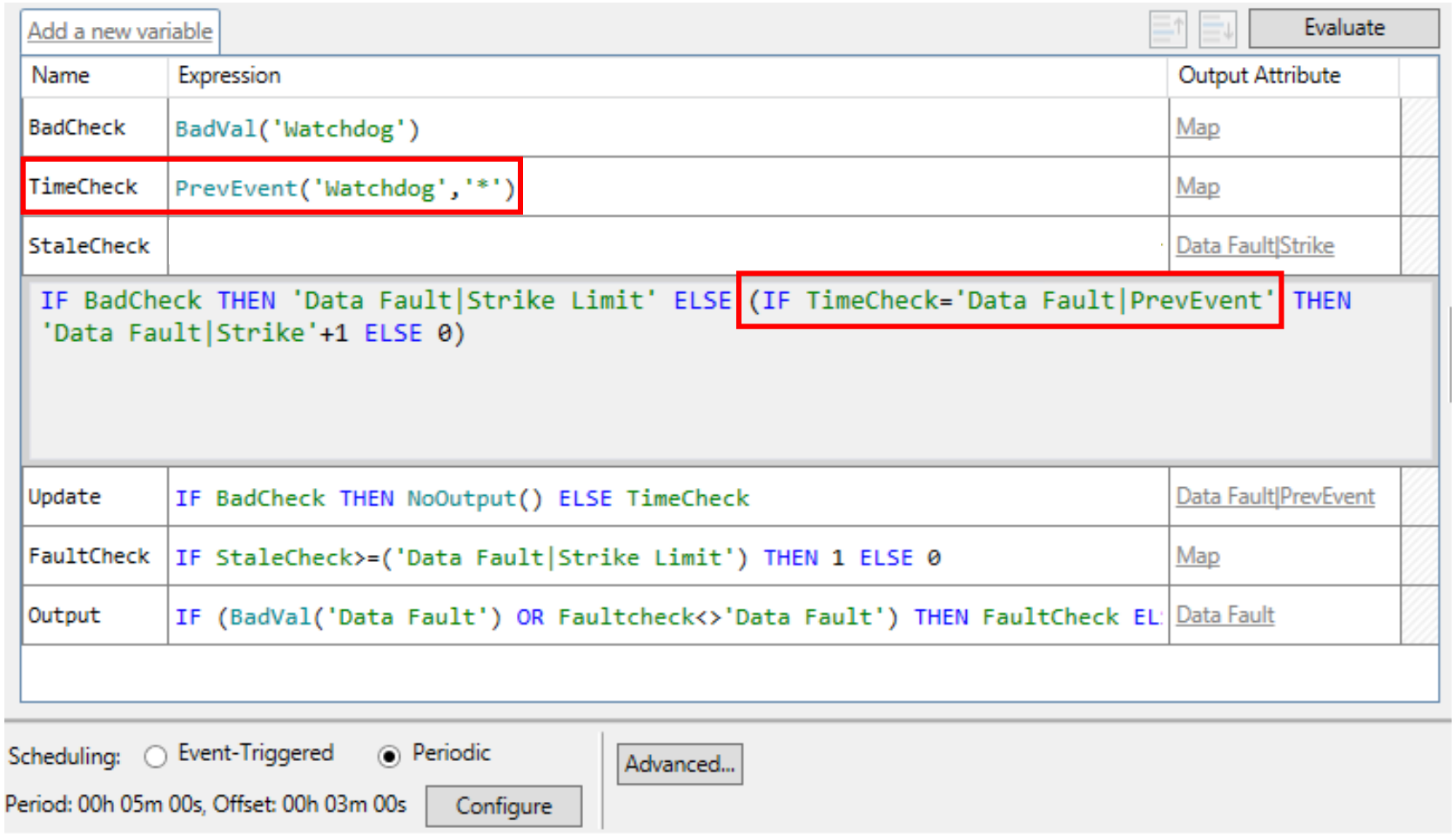
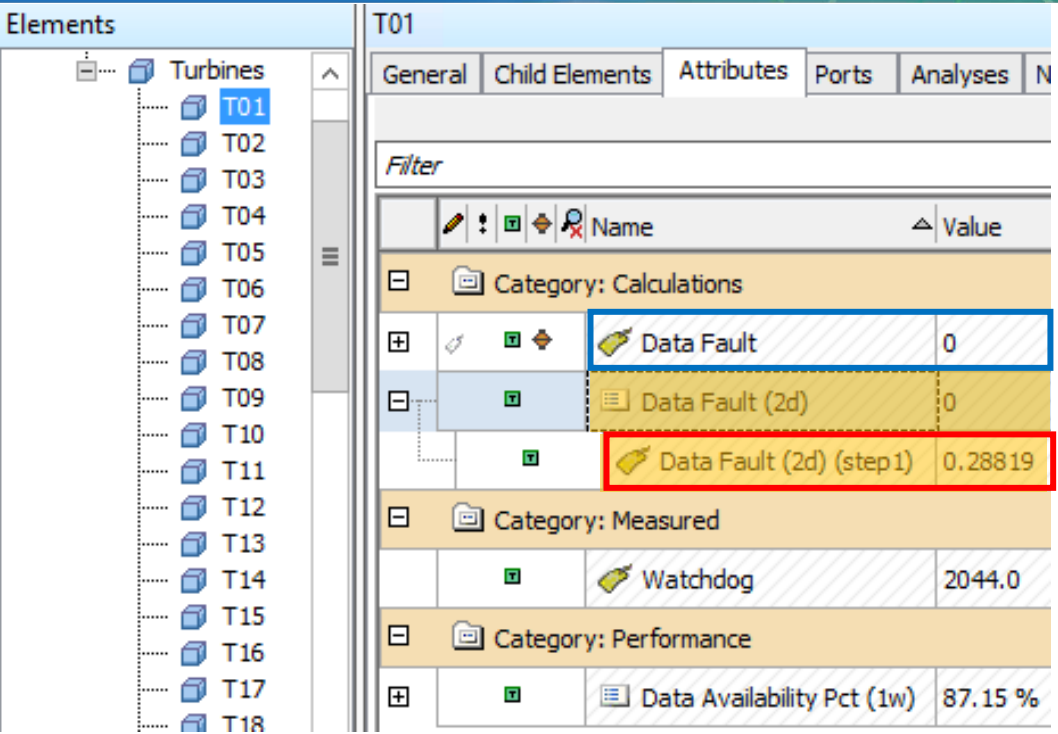




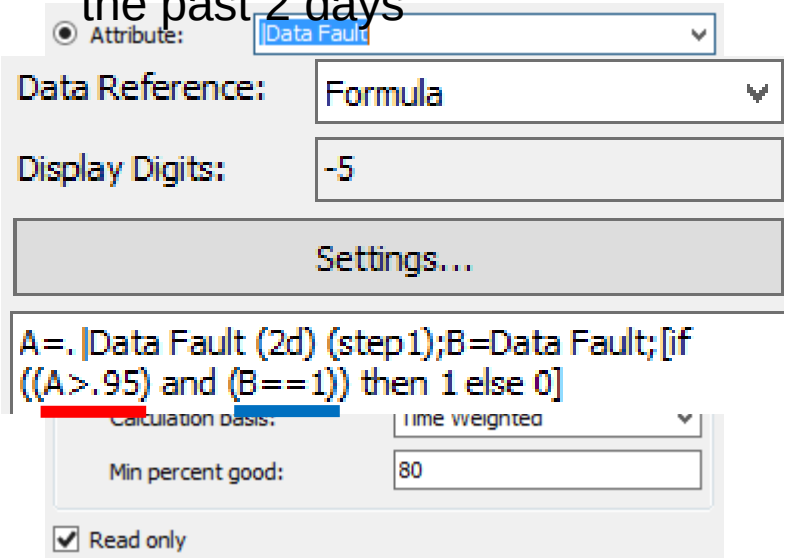


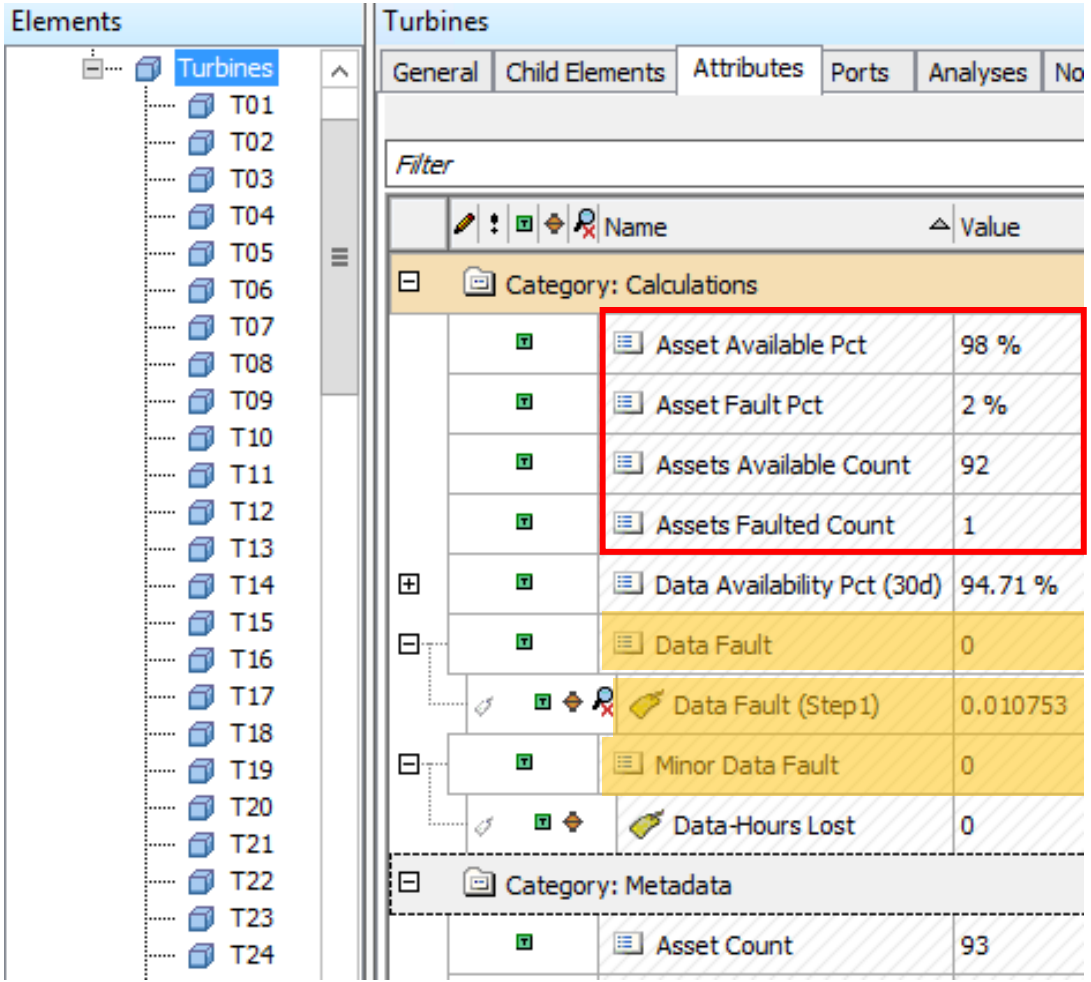


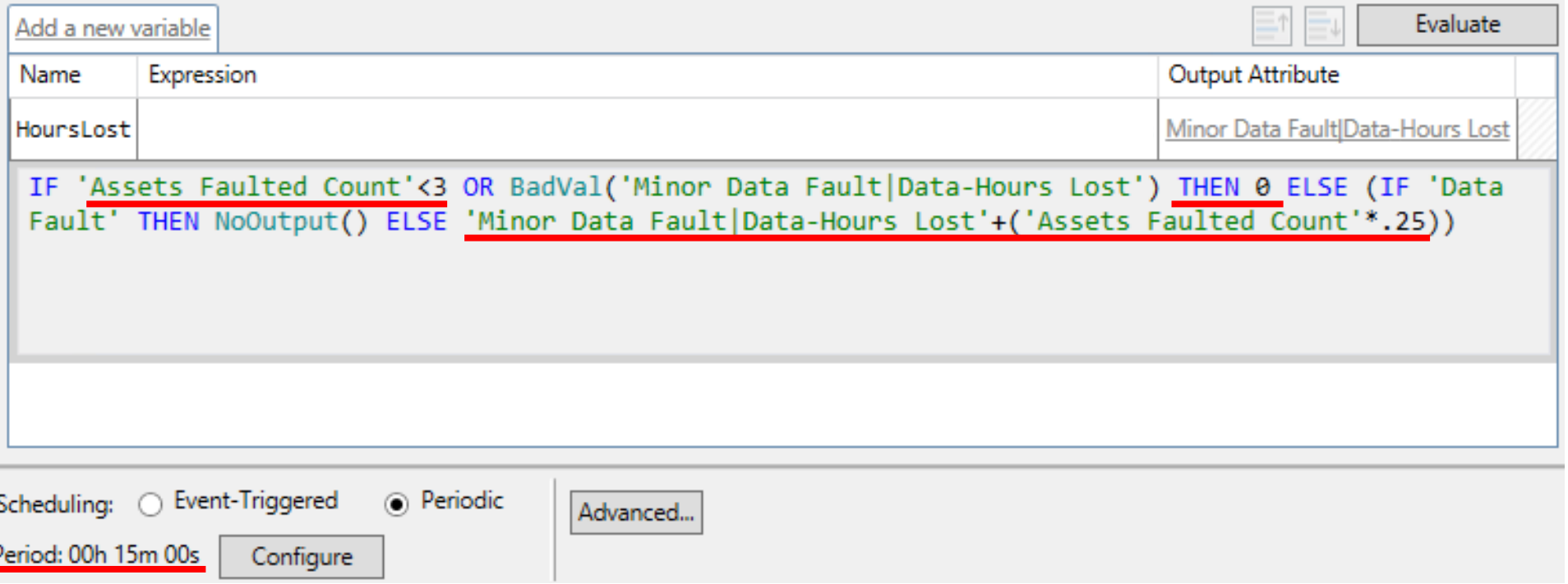


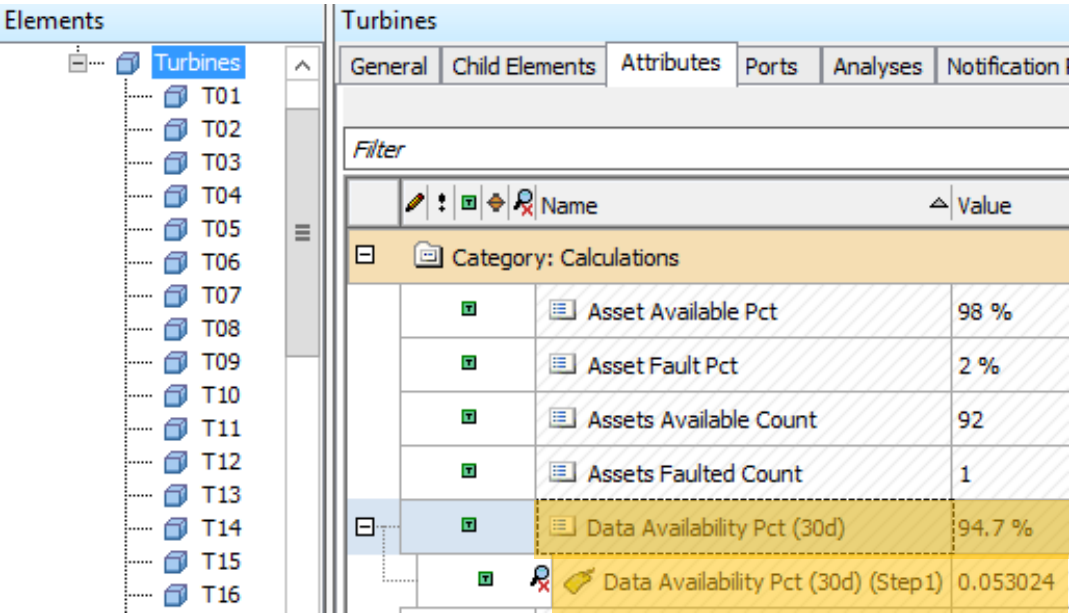
Data Fault (2d) (Step1)

- Determines if there is an ongoing Data Fault if the attributes over the past 2 days



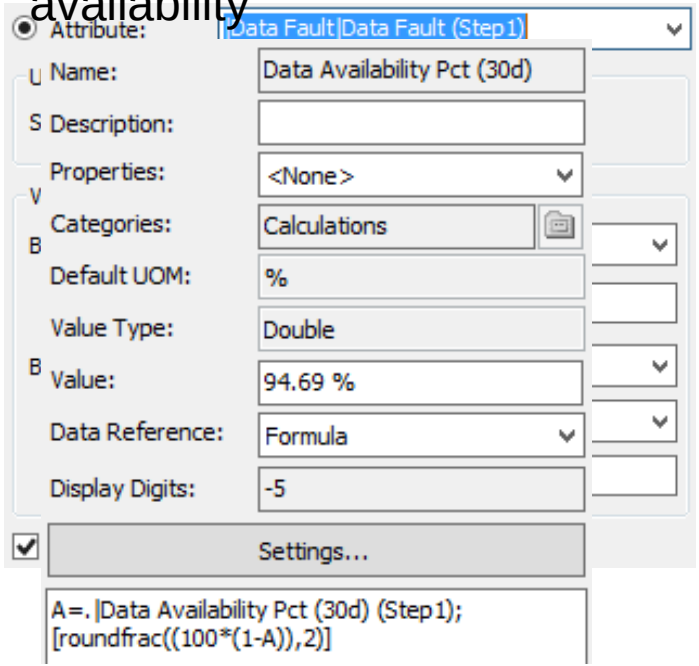






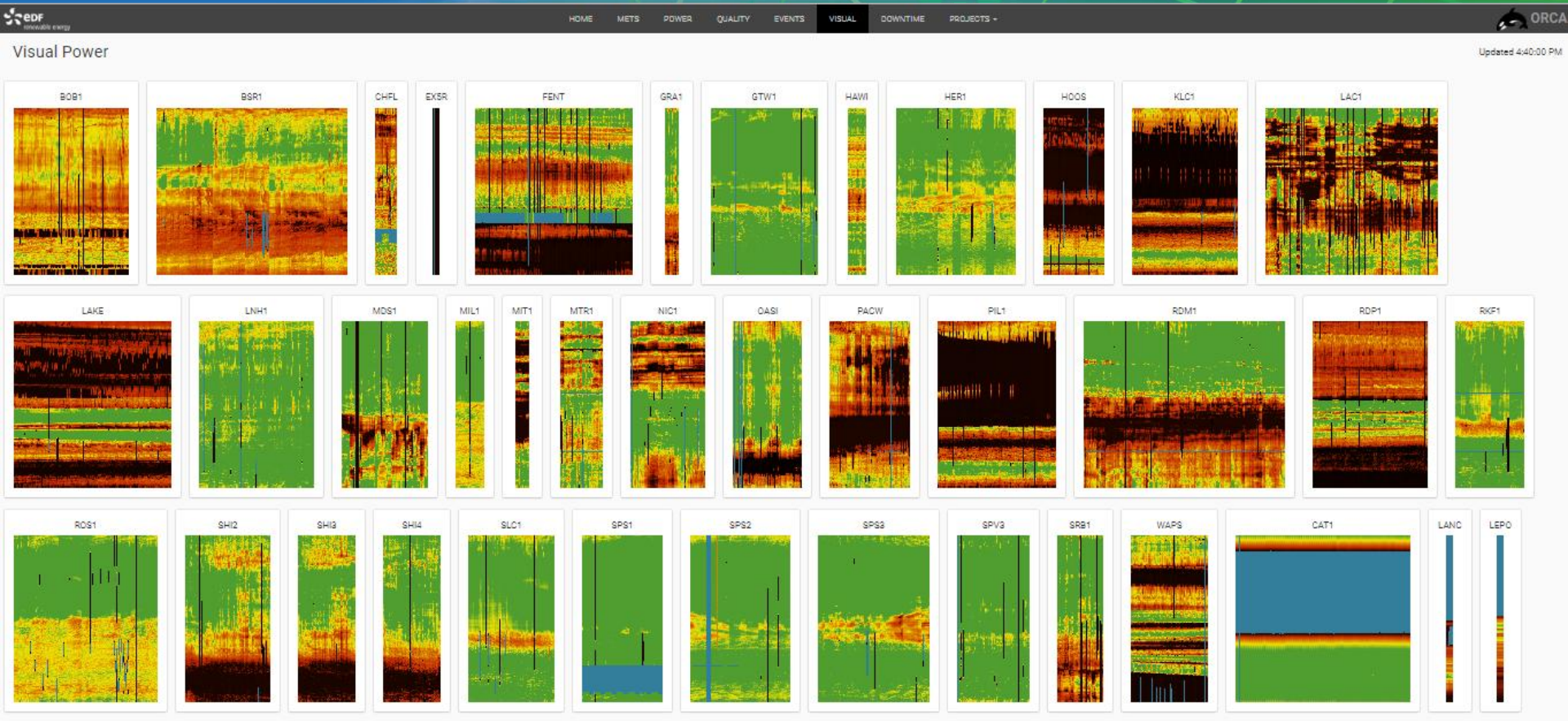
Data Availability Pct (30d) (Step1)

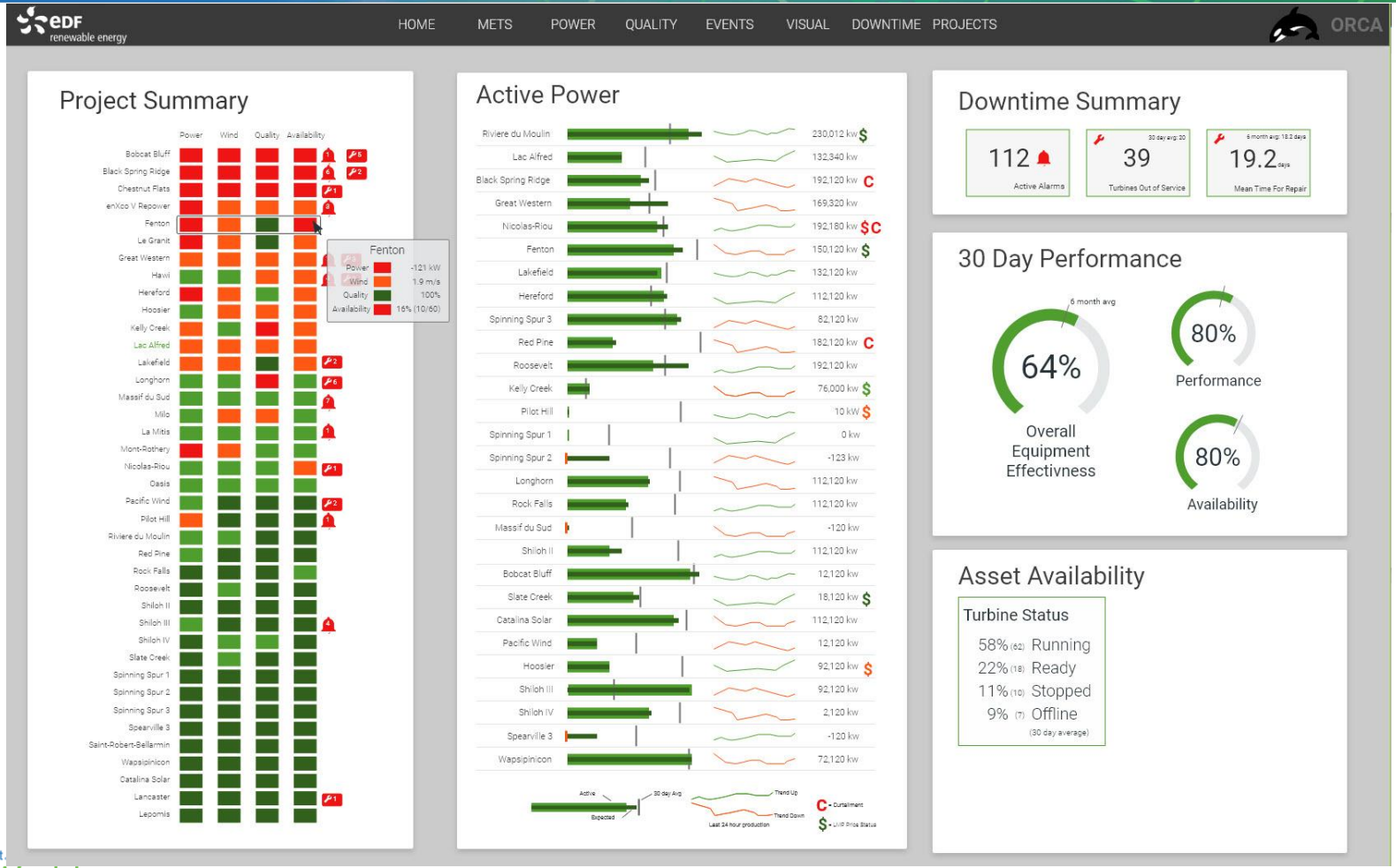
- Takes (Step1) weighted average of the Fault Ratio over the past 30 days
- Overall the result to reflect availability

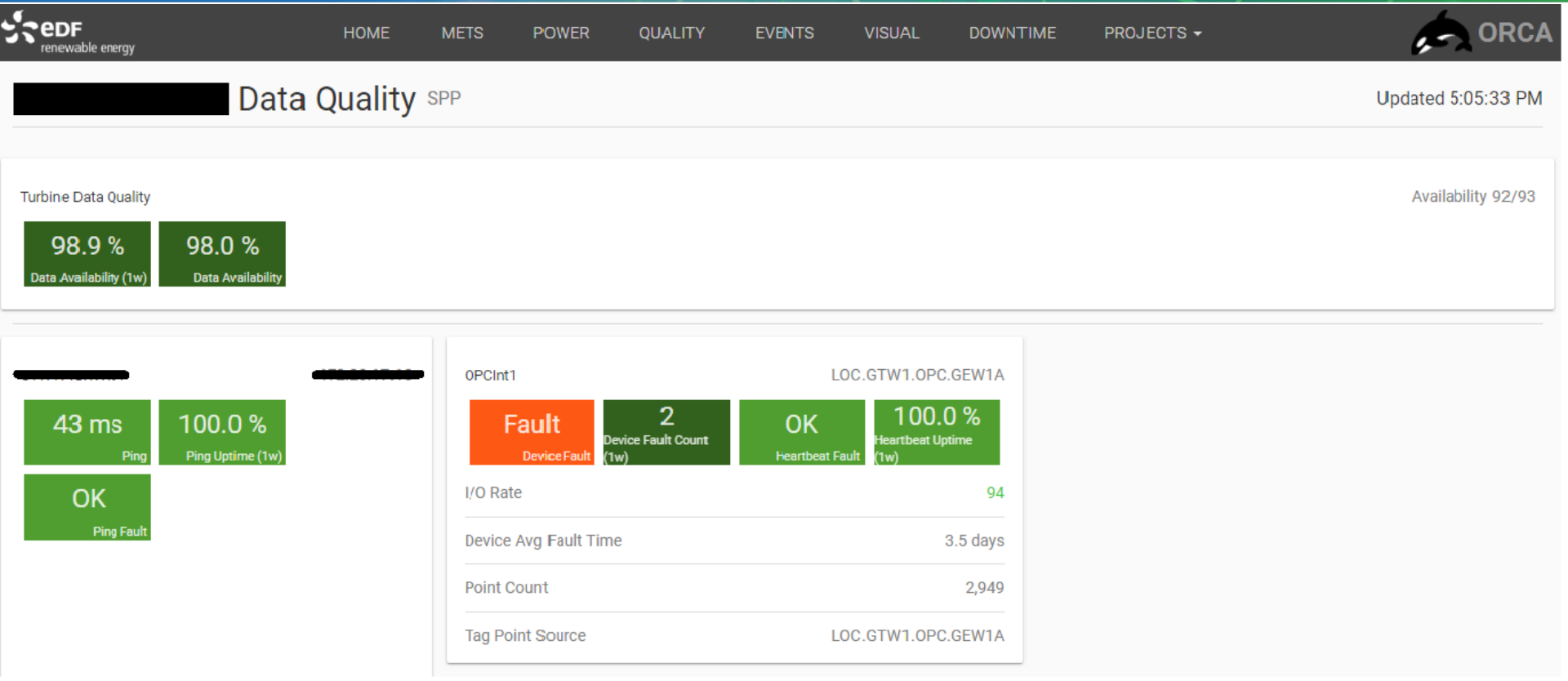


Results

- Turbine data issue response time reduced from hours to <30m
- Minor turbine issues addressed
- Substation and Met issues reduced from passive to <30m
- Data Quality improved from 90% to 97%







Next Steps

- Runaway lag trigger
- Data Substitution (where possible)
- Perfmon for OPC servers/RTAC
- Automated solutions, trigger scripts

Thanks for Listening!

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