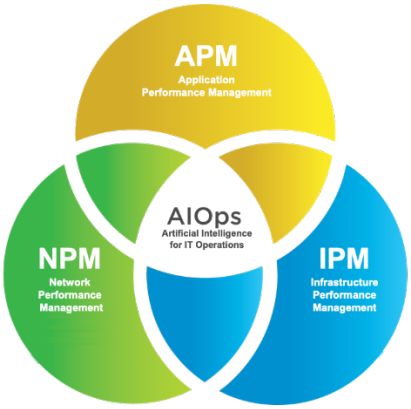
FAQ - VirtualWisdom as your platform for Artificial Intelligence for IT Operations (AIOps)



1. What is AIOPs and why are so many vendors using this term?

Artificial Intelligence for IT Operations (AIOPs) is a term coined by Gartner and it refers to the combination of big data, machine learning and visualization to enhance IT operations like performance analysis, anomaly detection, event correlation and analysis, ITSM and automation.

2. How does VirtualWisdom deliver on the promises of AIOps?

VirtualWisdom excels at anomaly detection and root-cause analysis even when used in an agentless software-only solution involving the various software integrations. Using it big data analytics, it can detect workload drift over shared infrastructure and identify rogue applications using underlying shared infrastructure which may be impacting the SLA of business-critical applications. This requirement to proactively monitor hybrid infrastructure used by business-critical applications impacts all industries including oil & gas, healthcare, financial services, energy utilities. VirtualWisdom delivers these capabilities in the following manner:

Historical and streaming data management

- VirtualWisdom retrieves data from siloed tools and IT disciplines including events, metrics, logs, job data, tickets and monitoring.
- It ingests data from multiple sources agnostic to the source or vendor using software integrations which cover the full-stack from VMs down to storage LUNs or File Systems (software integrations for FC SAN, FCoE, Cisco SAN Analytics, VMware ESXi, Microsoft Hyper-V, IBM PowerVM, Dell EMC VMAX, PowerMax, Isilon, NetApp storage, IBM SVC, Dell EMC VxFlex OS, VMware vSAN).

Basic and advanced statistical analysis

- Purpose-built Machine Learning based analytics like Capacity Forecast collect max, min and median data, plot statistical points once an hour and then store it in a database for long term retention and analysis. The focus of this analytic is to help you forecast capacity for compute, network and storage so you may plan your purchases intelligently.

Automated pattern discovery and prediction

- Purpose-built Machine Learning based analytic Trend Matcher takes a base trend, then goes through its inventory looking for pattern matches. The result is topology-aware cross silo correlation and pattern matching that speeds problem identification.

Anomaly detection

- Purpose-built Machine Learning based analytic Event Advisor looks for anomalies and deviations from typical workloads. When used with the Trend Matcher analytic this results in a powerful anomaly detection and root-cause analysis solution.

Root cause determination

- VirtualWisdom uses a run-book style approach to root cause determination. "Investigations" in VirtualWisdom codify 10+ years of professional services trouble-shooting and optimization experiences into the platform. Unlike other monitoring products which would stop at generating alerts, in VirtualWisdom, out-of-the-box best-practice alerts cause a case to be opened, which fires up an investigation which triggers the right ML-based analytic which displays appropriate graphs or charts to identify root-cause of infrastructure issues impacting business-critical applications.
- An example is the "Application Workload Drift" which is an out-of-the-box investigation that looks for a change in a workload profile which could be a symptom of changes in response times of a business-critical application.

Prescriptive advice

- VirtualWisdom provides prescriptive advice on root cause of infrastructure issues via the purpose-built Investigations.
- Proactive role-based dashboards in VirtualWisdom surface recommendations from purpose-built analytics which run in the background. In doing so, they provide opportunities for optimization of shared infrastructure hosting business-critical apps.

Topology Visualization

- In VirtualWisdom the topology view can start with an application or a host and goes down through the switching fabric (both FC and Ethernet) to the shared storage (LUN or File System).
- In scenarios where Software Defined Storage (SDS) like VMware vSAN or Dell EMC VxFlex OS is being mapped out, the topology view is from a client application through to storage on the SDS cluster.
- The topology concept flows into analytics like Trend Matcher resulting in a topology-aware Trend Matcher.

3. What AI/ML capabilities within VirtualWisdom make it an AIOps platform?

Purpose-built and patented Machine Learning-based analytics that enable:

- Seasonal trend analysis to identify normal seasonal behavior and alert where there are deviations from this normal behavior
- Cross silo correlation at various levels
- Optimization of queue depth settings for hosts hosting critical applications and using multi-vendor shared network storage
- Balancing and optimization of VMs
- Balancing of storage ports
- Capacity forecasting at the compute, network and storage level.
- Anomaly detection for faster problem detection

4. What does VI mean by applied intelligence?

In addition to being an Artificial Intelligence system, VirtualWisdom also offers Applied Intelligence. The intelligence necessary to correlate vast quantities of machine generated big data from compute down to storage is provided in VirtualWisdom by patented machine learning based analytics. Out-of-the-box Investigations deliver the necessary level of applied intelligence by automatically selecting the right analytic for the task at hand and surfacing recommendations after running that analytic, so all that a user must do is accept the recommendation and open an internal change control ticket to make the suggested changes. Our rationale is that an IT Ops user should not have to use a "decoder-ring" to select the right analytic for the task at hand.

5. What is unique about VirtualWisdom as an AIOps platform as compared to other vendor products which also claim to be AIOps capable?

- **No sampling**: Some vendors who claim to be AIOps capable collect data at 10 min intervals and retain it for 2 hours. In contrast VirtualWisdom collects data at a 1 sec interval which is the highest level of fidelity available in the industry. By collecting data at this granularity VirtualWisdom can identify spikes in infrastructure issues that persist for a few milliseconds and which are missed by other vendor products.
- **No fear of "vMotion sickness"**: Some vendors perform automation of VMs without enough background data. In doing so they create a scenario that we refer to as "vMotion sickness." In contrast, the probability based analytic in VirtualWisdom makes a data driven decision based on studying workloads over 6 weeks (42 days).
- **Depth of integrations result in data-driven decisions**: For example, some vendors check off support for Dell EMC VMAX storage but when you read the fine print you learn that the coverage involves collecting 13 performance, utilization and capacity metrics at a 10 min interval from the VMAX array. In contrast, VirtualWisdom via the software integration for Dell EMC VMAX and PowerMax collects over 200 metrics around response time, utilization and capacity across 10 unique entities. This is the difference between just checking a box versus providing actionable data-driven coverage.
- **Patented home-grown analytics**: Some vendors who claims to be AIOps capable collect data about misbehaving applications or infrastructure but then feed it to 3rd party tools like Google TensorFlow or IBM Watson. In contrast, VirtualWisdom offers a one-stop solution with purpose-built Machine Learning based analytics combined with a run-book style approach to root-cause analysis. We believe that you should not have to be an expert on Machine Learning to use an AIOps platform.

6. Will an AIOps solution involving VirtualWisdom give management a view with real-time insights into how IT is supporting the business?

Pro-active role-based dashboards (in this example for the VP of Infrastructure) like the one shown below give management real-time insights into how IT supports the core business.