Ptak / Noel

IBM Tivoli's Predictive Analytics Strategy for Enterprise IT Operations

Summary:
IBM customers are significantly improving business outcomes by applying analytics to business projects. Similar results should be achievable by enterprise IT organizations when analytics technologies are applied to IT-specific challenges and operational processes. Delivering IT-ready solutions based on predictive analytics has been part of IBM Tivoli's strategy since 2008. This paper outlines IBM Tivoli's progress in incorporating predictive analytics into Tivoli's integrated service management solutions. This paper also discusses how IBM Tivoli's analytics strategy has expanded to incorporate new technologies from IBM's recent acquisitions (Cognos, SPSS, Netezza, etc.). Successful delivery of this strategy will enable IT organizations to simplify operations management, proactively prevent business disruptions stemming from a dynamic infrastructure and optimize IT resources using operational insights.

Predictive analytics changes the game for business and IT Operations

Analytics applied to business projects are dramatically improving business outcomes with respect to the quality of operations and operational decision making by business managers and government agencies. IBM business customers are reaping the benefits. For example, the vertically integrated fruit purveyor, Sun World[1] uses analytics across a variety of farming data, including root stock, timing, location, irrigation and crop type. As a result, the company has seen its water use per unit decline 8.5%, fuel usage decrease by 20% and labor efficiency increase by 8%. The Memphis Police Department[2] uses predictive analytics to evaluate incident patterns and proactively deploy personnel to act as deterrents in forecasted criminal 'hot spots' throughout the city. As a result, serious crime has been reduced by more than 30% since 2006. The Swedish capital of Stockholm[3] uses a congestion analytics system. As a result, automobile traffic has been reduced by 20% and average travel times have declined by almost 50%.

Similar results should be achievable by enterprise IT organizations. Imagine being able to reduce network congestion by 20%, or decrease the risk of new application deployments by 30%, or schedule your best datacenter engineers to be onsite when your critical business services start behaving erratically. These scenarios become possible when analytics are more broadly applied to enterprise IT's operational challenges.

Tivoli applies predictive analytics to IT Operations

Applying analytics technology to enterprise IT's operational challenges is not a new endeavor for Tivoli. In 2008, Tivoli outlined a predictive analytics strategy for proactive service management with an eye towards simplifying datacenter operations management.[4] Since then, Tivoli has made significant progress towards delivering on that strategy, for example:

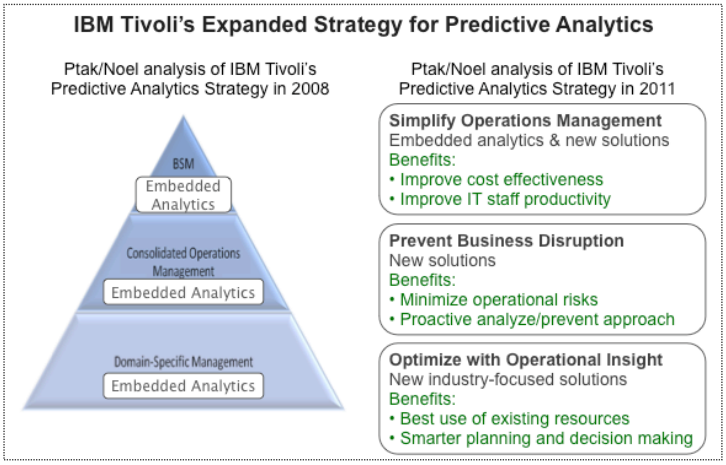
- Analytics for dynamic baselining, linear trending analysis and predictive threshold violations are included in the latest versions of IBM Tivoli Netcool/OMNIbus, IBM Tivoli Network Manager, IBM Tivoli Network Performance Manager (TNPM), IBM Tivoli Business Service Manager (TBSM), IBM Tivoli Monitoring (ITM) family of products and IBM Tivoli Composite Application Manager (ITCAM) family of products.
- Streaming analytics are an integral part of IBM Tivoli Network Performance Manager.
- IBM Tivoli Monitoring for Virtual Systems incorporates capacity planning, what-if analysis and resource forecasting for right sizing virtual machines for various workloads
- IBM Tivoli Monitoring for Energy Management shows IT staff how to deploy virtual images in the most energy-efficient manner.

Tivoli also contributed its expertise to IBM's other analytics endeavors, from developing event driven architecture and event formats[5] to enabling low latency event stream processing. For example, Tivoli professionals worked closely with their WebSphere counterparts to develop WebSphere Business Events and eXtreme Scale solutions. These solutions have proven capable of processing more than 1.6 million events per second with latency of less than one millisecond.[6]

At the same time, IBM has acquired other business intelligence and analytics technologies, including Cognos[7], SPSS[8] and Netezza[9], and improved its InfoSphere Streams[10] capabilities. This influx of new capabilities allows Tivoli to expand its predictive analytics horizons beyond its 2008 strategy.

Tivoli expands its strategy horizon

From Ptak/Noel's perspective, Tivoli's predictive analytics strategy for enterprise IT operations expands from an embed-only strategy to focus on three specific areas – simplifying operations management, preventing business disruptions stemming from infrastructure issues and optimizing resources using operational insights (see figure).



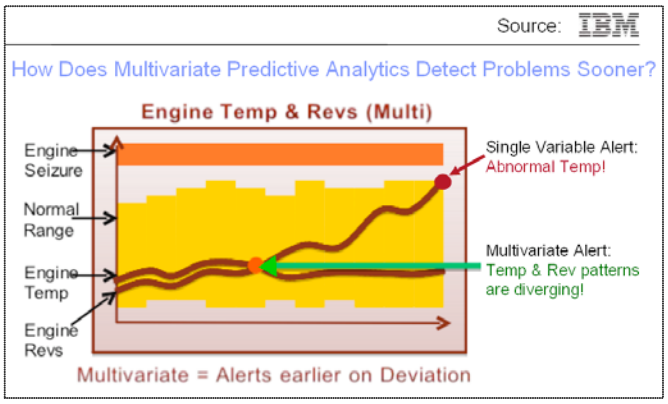
Simplify Operations Management continues Tivoli's efforts to embed and extend predictive analytics capabilities across its entire portfolio. The goal here is to insert new capabilities from Cognos, SPSS, etc. into existing Tivoli Operations solutions in ways that are consumable by busy datacenter staff – primarily by enabling the outputs of new predictive analytics solutions to be seamlessly consumed by the likes of ITM or TNPM. For example, the new predictive analytics solutions will rapidly absorb new data sources as new infrastructure is deployed, augment service models in ITCAM or TBSM by identifying dependency patterns, and improve early warnings in TNPM about abnormal conditions that can lead to failure. As a result, everyone from frontline service desk staff to datacenter operations personnel to level three engineers can make smarter, data-driven decisions.

In Ptak/Noel's opinion, continuing an embed-and-extend strategy is vital because there is too much raw data for datacenter staff to consume in a timely fashion. IT management solutions are most useful when they become smarter at preprocessing raw data and presenting enriched information in a format that is relevant to staff tasks and decision making. It is not enough to provide an impending out-of-memory alert because it will be lost in hundreds of similar alerts. Ideally, predictive analytics will enrich those alerts with additional information (e.g. business impact, deployment characteristics, configuration or utilization changes, past resolutions, etc.) to enable busy staff to intelligently prioritize and streamline their activities.

Prevent Business Disruption focuses on moving from a reactive break/fix approach to a proactive anticipate/prevent approach for ensuring that enterprise applications operate at peak performance. There are several avenues for Tivoli to help IT staff move away from a break/fix approach with new service assurance products leveraging additional analytics. For instance, application and service experts[11] can analyze past performance behaviors captured in the Tivoli data warehouse to mimic the predictive approach used by the Memphis Police Department. Application experts would use new

Tivoli solutions to create predictive models (leveraging SPSS technology). Those models are compared against live data streaming in from hundreds of datacenter metrics (leveraging Infosphere Streams technology) to generate predictive alerts that are fed to Netcool/Omnibus or TBSM.

Another avenue involves rethinking the break/fix approach entirely. The break/fix approach uses customer-impacting symptoms (Service Desk calls or abnormalities in a SLA metric) to identify existing datacenter problems, i.e., someone is suffering before diagnostics begins. IT can be proactive with the break/fix approach if a knowledge base of problems and early-warning symptoms already exists. However, maintaining those knowledge bases is difficult because enterprise software and deployment architectures are increasingly dynamic and event driven. The problems and symptoms seen on one day may never reoccur because of the constantly changing interactions between services, software and infrastructure. Additionally, the changing interactions give rise to constant stream of new symptoms and never-before-seen problems. This means datacenter staff must become adept at identifying never-before-seen problems.



IBM Tivoli's strategy for addressing this emerging dynamism is to deliver predictive analytics for understanding the normal patterns of behaviors across multiple metrics simultaneously (see figure). When several metrics have similar behavior patterns, problems can be identified when those metrics start moving out of sync. In some cases, problems are identified long before there are visible symptoms, allowing staff to prevent the aberrant system behavior entirely.

Optimize with Operational Insight focuses on the evolution of traditional resource utilization reporting and capacity planning towards the use of operational insight to drive better business outcomes within specific industries. The initial strategy is to deliver solutions targeting enterprise staff wrestling with resource consumption issues.[12] One aspect of this evolution would advance the art of capacity planning beyond basic 'straight-line' trending analysis for resource utilization. Including non-linear and cyclical trending analysis produces more accurate utilization predictions, enabling any enterprise IT organization to enjoy more efficient resource allocation and lower operational costs.

The longer term strategy is to develop industry-specific solutions, such as operational insight for cloud service providers (see figure) or intelligent infrastructure utilization for media and entertainment providers.

Conclusion

There is no question that more automated intelligence and analysis must be incorporated into IT's operational solutions and decision making processes. In Ptak/Noel's opinion, Tivoli has put together a comprehensive strategy for providing IT organizations with the same predictive analytics capabilities that delivered proven investment returns on business projects.

It is important to note that every level of Tivoli's strategy involves adapting general-purpose business analytics technology to solve IT-specific problems and provide benefits unique to datacenter operations. This is crucial because IT organizations do not have the time or resources to experiment with applying innovative technologies (such as predictive analytics) to their IT challenges and processes. Thus simply branding a general-purpose predictive analysis engine as a datacenter solution will not guarantee IT organizations the same level of investment returns as enjoyed by the business units. Achieving similar ROI results requires taking on the work of crafting a datacenter-ready solution from innovative predictive analytics technology. Fortunately for IBM customers, Tivoli plans to shoulder the effort of delivering datacenter-ready solutions which can convert the ideas of reducing network congestion by 20%, reducing deployment risks by 30% and proactively deploying IT personnel into achievable goals.

---

[1] IBM Press Release: California's Sun World Transforms Produce Business with IBM Technology, 2010, available at http://www-03.ibm.com/press/us/en/pressrelease/32159.wss

[2] IBM Press Release: Memphis Police Department Reduces Crime Rates with IBM Predictive Analytics Software, 2010, available at http://www-03.ibm.com/press/us/en/pressrelease/32169.wss

[3] IBM Press Release: IBM Helps City of Stockholm Predict Better Commuting Options, 2010, available at http://www-03.ibm.com/press/us/en/pressrelease/29903.wss

[4] Ptak/Noel Commentary: Proactive Service Management Through IBM Tivoli's Predictive Analysis, Oct 2008 available at

[5] IBM Redguide: A Conceptual Model for Event Processing Systems, March 2010, available at http://www.redbooks.ibm.com/abstracts/redp4642.html?Open

[6] IBM Press Release: IBM Extends Lead in Business Event Processing Software With New Products, Services, Sept 2008, available at http://www-03.ibm.com/press/us/en/pressrelease/25074.wss

[7] Cognos provides intelligent reporting and charting display options for historical data

[8] SPSS identifies patterns in historical data and creates predictive models

[9] Netezza combines data warehousing and analytics into a high-performance network appliance.

[10] InfoSphere Streams enable rapid comparisons of live streaming data to predictive models

[11] These experts often have the dual role of designing the production deployments of custom enterprise applications and working on the knottiest problems discovered by operations teams once the application is in production.

[12] For example, managers of heterogeneous virtualization platforms who must create and optimize provisioning and de-provisioning policies, or those involved the detailed planning and orchestration work for workload migrations and infrastructure upgrades or private cloud deployments.

Publication Date: May 13, 2011

This report was developed by Ptak, Noel & Associates LLC with IBM assistance and funding. This report may utilize information, including publicly available data, provided by various companies and sources, including IBM. The opinions are those of the report's author, and do not necessarily represent IBM's position.

About Ptak, Noel & Associates LLC

We help IT organizations become "solution initiators" in using IT management technology to business problems. We do that by translating vendor strategy & deliverables into a business context that is communicable and actionable by the IT manager, and by helping our clients understand how other IT organizations are effectively implementing solutions with their business counterparts. Our customers recognize the meaningful breadth and objectively of our research in IT management technology and process.

www.ptaknoel.com