TBM COUNCIL

AOL

Aol.

TBM AWARDS CASE STUDY

Technology Business Management (TBM) is a methodology, community and category of software for data-driven management of the business of IT.

AOL

TBM @ AOL	
To help its media properties like Huffington Post and TechCrunch innovate faster and more profitably, AOL used its cost and performance model to determine it should embrace public cloud. It has already retired 14,000 servers, sold off a data center and lowered its carbon footprint 42%. Deep understanding of its service costs, capacity and performance was also a critical factor in AOL's decision to acquire the majority of Microsoft's advertising business this summer.	
Program Owner	• Office of the CIO (2015) • Infrastructure & Operations (2012-2014)
Related Initiatives	• Public cloud strategy • Data center consolidation • Mergers & acquisitions
TBM Solutions	• Cost transparency • Application & infrastructure analysis • Bill of IT
Areas of Analysis	• Cloud • Data Center • Business Services • Business Units • Network • Vendor • Labor • Compute • Storage
Insight	• 75% of a shared load balancing service was being consumed by customer-facing e-mail product
Outcomes	• Reduced costs 23% year while supporting 127% growth in business transaction volume • Saving $350K/month after migrating homegrown object store to public cloud • Shifted production workloads in public cloud from 0% to 10% in eight months • Shifted from captive data center buildout to cloud-first strategy; sold data center property • Reduced carbon footprint 35% by retiring 14,000 physical assets

AOL Corporate Overview	
AOL is a media technology company with a mission to simplify the internet for consumers and creators by unleashing the world's best builders of culture and code. As one of the largest online properties with over 700 million unique users in 22 global markets for its premium brands and combined Microsoft inventory, AOL is at the center of disruption of how content is being produced, distributed, consumed and monetized by connecting publishers with advertisers on its global, programmatic content and advertising platforms. As of June 2015, AOL is a subsidiary of Verizon. Key businesses includes Advertising Platforms and Services, Content Brands (Huffington Post, Engadget, TechCrunch, Moviefone, and many more), Local content and platforms (e.g. Mapquest), and Membership Services (Email, AOL Instant Messenger, dial-up ISP to 2.1M users).	
Industry	Media Technology
Headquarters	NY, NY
Revenue	$2.5B
Employees	5,600

How AOL Uses Data to Lead a Transformation to Cloud

AOL has been through its fair share of transformations, from pre-Internet pioneer America Online, to a media/on-line hybrid known as AOL Time Warner, to independent digital media company AOL. This summer, AOL was purchased by Verizon, setting the stage for its next transformation into a global-scale advertising and media platform. Its strategy includes using Verizon's mobile data as its strategic advantage to compete alongside Google's search data and Facebook's social data assets.

To fuel AOL's business re-invention, CIO James LaPlaine is using TBM to help lead a technology transformation that includes a shift from captive data centers to a public cloud-first strategy, rationalizing technology investments from acquisitions, and optimizing both infrastructure and applications to process business transactions more efficiently.

Early results on business transaction efficiency are promising: LaPlaine has been able to reduce costs of AOL's central technology services by 23% year over year while supporting 127% growth in business transaction volume.

To accelerate all of his key initiatives, LaPlaine is using TBM to transform AOL's technology business with data about services that drives decisions and behavior change across the business and technology organizations.

Involving the Business in Cost Model Design

Before becoming CIO in 2015, LaPlaine headed up infrastructure and operations of AOL's central technology, which was shared across media properties such as MapQuest, Tech Crunch and AOL.com. In 2011, the team began using spreadsheets to calculate the share of service costs to charge back to individual media properties. They soon reached the limit of what they could maintain

manually in spreadsheets, yet they were short of the goal of providing media properties with the detail they needed to fully trust the costs, understand the drivers and make choices about consumption.

In early 2012, AOL discovered that many of its peers were having significant success with a TBM approach for cost and performance analysis of technology services. They saw how a TBM system could use automation to combine operational and financial data into a model that could give them more granularity on a regular basis without hiring more staff. “The timing of where we were on our TBM journey and to where the software had evolved matched up perfectly for us,” says LaPlaine. “The system has really accelerated our journey.”

LaPlaine started small and took an iterative approach to understand what types of information the business needed most to make decisions. “In our first TBM model we started very simply with things like dividing our total compute cost by our number of servers.” This gave the business something tangible to react to.

“We first rolled out TBM to a friendly property that we thought would be willing to go through an iterative process with us, one that had already been asking financial questions,” LaPlaine recounted. “We showed them our portfolio of services and then we showed them the data and said ‘This is what you consume out of central infrastructure each month.’”

Engaging the business proved to be an effective way to zero in on particular data issues. “That was a learning process for all of us. We found problems in our general ledger, we had duplicate data, we were missing data, our CMDB (Configuration Management Database) attributed applications and infrastructure to the wrong properties …” LaPlaine asked for feedback on the methods used to calculate the total cost of services, how they were apportioned to the property, and what granular detail would make it more actionable. “We just worked iteratively through that process. And working with a friendly part of the organization first helped us get confidence, and be a more mature model and build through that.”

After growing comfortable enough with his team’s approach to modeling the costs for its portfolio of services, LaPlaine was ready for the next phase of his TBM transformation: meeting with corporate executives. “We decided to meet with the CFO first. The idea being, if we were going to transform the business, we needed to make sure we had the financial buy in at the highest levels of this company.”

As he did with select business leaders, LaPlaine approached the CFO with the goal of getting feedback and help in making it accurate and useful. “We probably did five or six iterative meetings with our CFO to improve the model directly with her,” he recalls. “Once we had her endorsement, actually winning over the rest of the corporate executive team was fairly easy because she led in saying, ‘These guys have really got a great idea and this implementation is going to change things for us.’”

Automating TBM

Director of TBM Emily Rittenhouse oversees the TBM program and system for AOL’s central technology group. She manages her source data model separately from her cost and KPI model so she can frequently add or swap out source data sets to continuously expand scope and improve granularity and accuracy. She does this simply by adjusting the rules on how a data set maps to standard fields already in the TBM system, so she doesn’t need to make changes to the cost model or reporting layer.

“Our model is very flexible,” Rittenhouse says. “Last month, for example, the team decided that the usage data for our Content Management System should come from a different monitoring tool with a different data structure. I loaded it in, adjusted the mappings and now it flows through our model and reports every month. The whole change took less than an hour.”

Today, Rittenhouse combines three data files on expenses from financial sources of truth with 40 files from IT operational systems. The operational data represents usage to apportion expenses up the model, from categories of technology to infrastructures services to services to business units.

With his background in infrastructure and operations, LaPlaine is intimately familiar with all sorts of operational tools but sees TBM systems as occupying a very different place in the management landscape.

“Our TBM system adds value differently than operational tools like service management or problem management systems. We need an independent view that all this operational and support data rolls up to and connects it to data about the business. We have service management data flowing into our TBM model and TBM data flowing out to service management. Rather than having one tool try to do all things, which I’ve seen happen in the past, we've really focused on keeping the model independent of any one management tool or data source.”

Rittenhouse looks forward to expanding her use of TBM into AOL’s technology planning process with the business. She says their current process of sending around spreadsheets by e-mail is “cumbersome and version control can become a problem.”

“The next step for us with TBM is bringing on a budgeting and forecasting tool to give us better and faster predictability by seeing variance between our actual expenses versus our plan. Ultimately we want to run central technology budgets through our cost model as they’re being created by various budget owners so we can see how they will come together to impact future costs for our media properties.”

Shaping Business Choice

Today AOL delivers cost transparency to various media properties and other parts of the business in the form of 66 interactive monthly invoices. Each invoice is a web page with interactive dashboards. Powered by the underlying cost and data model of their TBM system, business leaders can navigate through different views and layers of cost detail to better understand, trust and act.

Among those views and layers for each property are charts, graphs and data about the number of service units consumed (e.g. GB of solid state disk, GB of tape backup), their share of cost drivers for each service (e.g. load balancers, DNS services), their use of specific assets by name and location, and details about asset utilization (e.g. unused allocated storage, network bandwidth, CPU and memory utilization).

“Complete transparency is the goal, including the data behind the metrics, so that folks have no question whether these costs are made up based on arbitrary rules,” LaPlaine explains. “Now it's actually in the lexicon of the company, as in ‘Have you looked at the IT financial model this month?’"

As LaPlaine and his staff meet with various business owners to collaborate on decisions, they count on the predictable, consistent monthly cadence of the invoices to reveal trends and the impact of decisions. “TBM helps us tie dollars to decisions. One month we say if we do this, that cost will go up, or it will go down. When we revisit that decision we can look at the data to see: was our analysis right?” “As they see not just costs, but the services we provide, what drives their cost, and that their decisions and consumption actually impact the cost structure, it builds these secure, safe places to have all kinds of dialogs and move the transformation agenda forward.”

“Until people got their invoices and saw how much data we were storing for backup purposes, it was really out of mind,” explains LaPlaine. “Then they get the invoice and say, ‘Oh wow! I didn’t know we were holding onto that much data!’ or ‘I didn’t think it would cost that much! I don't need backups for these things. Please, get rid of it.’ Getting rid of the data isn’t just saving disk space, but also labor, power and network bandwidth.”

The effect of service cost data on business consumption often showed up in decisions about data backup retention. Business owners tend to forget how much of their old data backups are being stored, and how that adds up. Without seeing cost associated to it, the natural response is to avoid the risk of one day needing that data again but not being able to get access to it quickly, or at all. When costs are revealed for various service options, however, such as whether to get fast access to archived data from disk, slower access from tape, or never by deleting it, they can weigh the risk of no or slow access to old data against the value of using those dollars for something else.

LaPlaine credits the TBM methodology and the model they built in their TBM system with helping IT cement its position as a key player in the business. “We are an equal partner with the business. We are not a subservient IT organization. Having command of the facts about the technology costs to run and grow the business has built credibility. What we've done at the company is moved from IT transparency, which is where we began, to IT value.”

Changing Course on Data Centers

AOL has traditionally invested heavily in designing, building, owning and operating its own infrastructure. It owns and operates its own data centers, and built its own private cloud using open source hypervisor and provisioning stacks. So as the company was considering options for expanding its computing power in 2013 it was AOL’s natural reflex to look at how much of which kinds of new data center capacity to build or acquire.

LaPlaine had an alternative data strategy in mind: consolidate into a smaller and more modern data center footprint while attaining more of its capacity and capability from public cloud. His cost model design meetings with the CFO provided an ideal opportunity to share his thinking on data center strategy within the bigger picture context painted by the numbers from his TBM system.

“She helped us build the TBM cost model which was based on our current course with captive data centers,” LaPlaine recalls. “Then we used the data to model a different scenario where we would increase utilization to reduce our infrastructure footprint, collapse a facility, and sell it for a nice return. She could see what we were envisioning.”

When it was clear the CFO understood and liked the proposal, LaPlaine presented it to AOL’s board of directors. LaPlaine recalls, “The CFO started the conversation off with, ‘I met with James' team five or six times, and they completely convinced me that it's the right thing to do. I'd like you guys to hear it too.’ It was like it was already a done deal.”

With board-level approval, LaPlaine moved aggressively to execute on the new strategy using data from his TBM system to sift through which of his 60,000 data center assets to migrate and which to retire. The team created analysis that pulled together views of assets and workloads including capital commitments, asset age, depreciation schedules, power draw, bandwidth utilization, CPU and memory utilization of servers, disk utilization, and more.

“Having data was key to accelerating the moves. We were pretty aggressive when we thought we could reduce carbon by 20% in 12 months. We actually achieved a 35% drop in 12 months, and then another 7% on top of that in the first six months of 2015.

Among the results in 2014:

- 14,000 production assets retired, 12,000 migrated
- 3 megawatts per month reduction in power consumption
- 35% reduction in total carbon footprint (including co-location facilities)

Summing up the transformation, he adds, “So that's paying down the technical debt we built up in 30 years of business. It was probably one of the hardest things to do. It was one of the busiest years we've ultimately had. But if you went back and asked our staff, they generally say, "What a great, fun year 2014 was.”

LaPlaine believes his team’s TBM model was instrumental in bringing about the change in strategy. “Convincing the company that we needed to walk away from a facility we built and had been running for 18 years with 100% uptime is a pretty tall order and a radical idea,” he notes. “But I was confident in discussing the strategy, and the CFO was on board, because we had worked together on the TBM model that supported it with detailed, defensible data. I can't overstate how important this was.” He added, “It all started with a TBM conversation.”

Monitoring the Cost of Cloud Adoption

To steer the course from captive data centers to public cloud means managing public cloud costs. Although it may sound as if getting an invoice from your cloud provider is an easy, self-contained path to cost transparency LaPlaine contends that, “In fact, it’s becoming even more important to track costs of public cloud than your own infrastructure because the consumption of public cloud is so easy. You just a push button to stand up new infrastructure and new services. It's so easy to forget that they're running. When you're billed hourly, it doesn't take you long to run up a pretty large bill. If you don't have controls in place, there will be problems down the road.”

Rittenhouse uses her TBM system to automate tracking of public cloud consumption and cost with automated data transformation rules that translate the thousands of detailed charges from public cloud invoices each month into categories that fit AOL’s TBM model. “Consumption is mapped back to business units and their products so we can see what they’re using it for.”

For example, to understand the total cost of a unit of AOL’s compute service the TBM system bundles in its share of provisioning, hosting, support and other costs.

To make the comparison like-for-like the TBM system also burdens incoming public cloud charges with the cost to AOL to safely use and manage them, including monitoring, security and support.

Normalizing the cost of using public cloud alongside traditional services allows LaPlaine to guide business decisions. “Our view is we're participating in a marketplace of technology,” he explains. “We're an important service provider, but we’re not the only one our business units use. We need to know how we fit and perform in the marketplace of services and we need to provide that transparency to business leaders to advise them and let them make the right decision.”

“For example, one media property was using a home-grown object store, built and operated inside the company, to store multi-petabytes of data. When we ran it through the TBM model we saw we could probably do this more effectively using third party services hosted in a public cloud, which is what the business decided to do. That one move saved the company $350,000 a month in the storage service costs in just one property, and it adds more disaster recovery because it stores multiple copies.”

The move to public cloud has been dramatic. “We have about 60,000 production workloads supporting our service portfolio. At the beginning of the year, zero% were in the public cloud. Seven months later we had about 10% of our workloads in public cloud. And we see the pace accelerating.”

In addition to helping the business make decisions, an integrated model of cloud and traditional services helps LaPlaine keep AOL’s long-term migration from captive data center to cloud strategy on track. “We use TBM to monitor cloud consumption because we need it to be in the same place and context as our captive data center costs so that we're comparing apples to apples. That lets us do ‘what-if’ scenarios and look at models to say, ‘If we transform this business or that service, what would the overall cost look like?’”

“Not everything is going to be perfect when it moves over into the public cloud,” LaPlaine cautions. “And not everything is going to be less expensive. Monitoring that pulse each month, seeing units of consumption of public cloud and how that compares to usage of our own captive services, seeing where in the business that’s happening, is all critical to making informed decisions about scale in a public cloud.”

While AOL’s overall trajectory is toward public cloud, LaPlaine says some services may move in the other direction. “If something got to a threshold where we said, we think we can do that more economically in-house, then we have the data to help support that decision.

LaPlaine and Rittenhouse also say the automation and model flexibility of the TBM system is important to keeping up with a dynamic cloud marketplace. “There are hundreds of releases of new services and iterations on services every year. And so our model has to be flexible enough to be able to bring in the cost differences.”

Embracing Cloud Economics

LaPlaine doesn’t mince words when describing the future of AOL’s private cloud strategy. “We’re going to get out of the private cloud business.”

Investments in virtualization and workload automation over the past several years had successfully reduced costs, but average server utilization in its captive data centers wasn’t significantly better than the industry average of about 7%. In keeping with his philosophy of full transparency, LaPlaine shared server utilization with the business, setting the stage for AOL’s transformation to a cloud-first strategy.

“It wasn't until we started sharing utilization in our monthly invoices that we really started having the discussion about the cost of maintaining so much equipment for the peaks and valleys in our business,” notes LaPlaine.

Cloud economics promises an efficient alternative to the traditional IT approach of build-to-peak: instead of buying and maintaining enough infrastructure capacity to run systems on their busiest days, a business can rent additional computing power for an hour, month or longer as needed. At AOL, the business owners were seeing first-hand how build-to-peak was impacting their profit and loss statements. The TBM system was showing them exactly how much they were paying each month to run servers that spent most of their time doing no useful work.

LaPlaine sounds like any other business person as he points out the advantages of cloud economics, noting, “We don’t have to carry the capital to manage the inventory to run systems at their peaks.” He adds a list of cloud’s other economic advantages such “speed to market, better redundancy, faster recovery and more geographic diversity”. These were some of the factors that drove AOL’s decision to make public cloud the default option for new business technology.

“We know we can't compete with cloud,” admits LaPlaine. “The big public cloud companies are building capability that is far beyond what we'll ever have the money and resources to do. So instead of trying to fight and stand alone, we’ve pivoted all the way to ’cloud-first’ for all of our properties.”

That’s not to say that AOL can’t ever beat cloud pricing. “We know we can be cheaper than public cloud on a unit of compute.” Like many other companies, LaPlaine uses his TBM model to compare his team’s internal services to public cloud-based services. The mistake many people make, he implies, is in thinking of those cost comparisons as the end in themselves rather than as building blocks in a more holistic, top-down view of value.

“Most people think cloud is more expensive than it really is because they’re looking at it wrong. But when you look at it holistically we can’t compete.”

LaPlaine explains how his team is developing software differently to take advantage of cloud architectures. "We are using this transformational notion of designs and architectures that are stateless and more collaborative from the get-go." He explains that this is a more effective way to achieve resilience than building "gold-plated data centers" to support the "unbelievably low latency requirements" of applications that were designed with the assumption that all their subsystems would always be up and running."

AOL is already using cloud to bring more muscle to compute-intensive services like real-time bidding for advertising placement, and seeing both cost and efficiency gains. "Where we've used public cloud for elasticity and done it wisely, we're saving money. With a real-time bidding system our average CPU utilization is almost 50%", multiple times better than estimates of industry averages of six to 12%.

Business Service Optimization

To help cut through complexity and drive decisions, LaPlaine has used transactions as a way to compare service options that defy useful comparison at the level of their parts.

When it comes to cloud, for example, LaPlaine says "We could be less expensive on unit cost of compute but not when you look at it holistically and normalize to cost per transaction." In other words, if you're deciding between a traditional versus cloud-based ad service, rather than getting mired in apples-to-oranges comparisons between incomparable architectures, you can focus on the cost per ad served.

AOL's revenue and competitive advantage depends, in part, on its ability to summon computing power for real-time bidding on advertisements. "We're participating in high volume transactions, kind of like high-frequency trading in the marketplace," LaPlaine explains. "So we need to look at the cost of architecture and geographic options to get closer to the consumer, for example."

While LaPlaine is working up to modeling higher-order business service transactions that can be more directly tied to revenue, he is already using technology service transactions to make decisions between the Mars and Venus of the technology world, software and hardware.

Recently, LaPlaine's team noticed that one business unit was responsible for 75% of the use of a hardware-based load balancing service for a customer-facing service. The high cost was impacting margins for the product. When they brought up this insight to the business unit they learned that the software development team had recently added a set of features that cause the service to slow down, so they asked the hardware team to provision more computing horsepower through the load balancer.

Coming from the infrastructure world, LaPlaine was very familiar with the challenges posed by misaligned incentives between software and hardware. "It is considered cheaper to throw more hardware at a property than it is to get software developers to spend time re-factoring their code," he noted. Without cost transparency, teams don't have the data to make decisions about trade-offs.

"Hardware was free before TBM," he added.

The software team was asked to estimate the cost of a software project to achieve a performance target of 2500 transactions per second using software rather than hardware-based load balancing. The team knew the cost of the hardware option from the real-world cost in invoices. When it became clear that the cost of developers' time would be more than offset by savings in the load balancer in a short period of time, the clear decision was to enhance the software.

"We get to challenge assumptions now that we have metrics. Before we had the metrics, you couldn't tell what was fact-based or what was emotional-based," said LaPlaine.

Put another way, if you can agree that the main purpose of a piece of fruit is to supply you with calories, then you have a valid metric way to compare an apple and an orange.

Sizing Up Profitability of Microsoft's Ad Business

As part of its strategy to compete more equally with Facebook and Google, in the summer of 2015, AOL acquired the majority of Microsoft's advertising business. This, in addition to being acquired by Verizon, gives AOL an enviable portfolio of digital business assets for advertising.

"We play in the supply and demand side of advertising. We participate in advertising exchanges. We have real-time bidding systems. And our view is that AOL is now in that portfolio of advertising, equivalent to Facebook, and Google, and the big players that are in that space. And with the addition of Verizon's data set, we now have new information to do better targeting, which makes content that people read and the advertising they see more relevant and more interesting to consumers."

As part of the deal, AOL will take over responsibility for sales of display, mobile and video ads on Microsoft properties in the U.S. and eight other markets, adding new assets and new demand onto AOL's portfolio of services.

"While we were doing the acquisition we needed to validate that the revenue we'd gain wouldn't be offset by additional cost in our infrastructure," explains LaPlaine. "We're adding all that traffic into our portfolio, so we needed to know if this looked like it would be healthy new business for the company."

LaPlaine used monthly data already in its TBM system for available capacity, transaction volumes and current costs and modeled the expected difference in costs to support the added number of transactions from Microsoft.

"We modeled what it would cost to support this new business," LaPlaine recounts. "We wouldn't have been able to do that, had we not first started with the transparency model. We wouldn't have had foundation. We would have done a ton of guesswork, probably by percentage. Someone would have said, 'Well, today our cost for IT is 5% so let's assume 5% for Microsoft.' If we had done that the math wouldn't support the deal and it wouldn't have happened.

"Maybe we would have been right, maybe we would have been wrong", he added. "I'm just glad we don't live in that world today at AOL.

Advice for Those Starting Their TBM Journeys

LaPlaine and Rittenhouse offer this advice for those just starting out with TBM or considering doing so.

Show your draft: "Just get started with a simple model so people have something to react to," advises Rittenhouse. "We started by dividing the total cost of all infrastructure by the number of servers. You'll get exposed to a whole bunch of specific suggestions you won't have anticipated. At the end of the day it will make your model mature much faster."

Collaborate, but don't bring a blank slate to the table: Echoing Rittenhouse, LaPlaine cautions, "Waiting for a democratic approach to a rule definition will cripple you." He offers this four-step plan for avoiding death by committee:

- Define a rule that you could explain the rationale for and put it in the model
- Stay vigilant each month and see if the data trend makes sense

- Share the result with business leaders that consume this service and explain the definition
- Inject the feedback you receive into the model (iterate)

Don’t wait to get caught on the defensive: “I think CIOs that don't have a focus on cost will be surprised when other people make the decision around cost for them. And I feel like that puts you in a very defensive posture, that you can be a big participant in how that should be shaped at your company.”