

Lean IT: “Waste Not, Want Not” Strategies to Reduce Eight Elements of Waste in IT

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ENTERPRISE IT MANAGEMENT MARKETING STRATEGY



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Executive Summary

Challenge

With the recent economic turmoil, the focus of IT management will invariably shift more towards cost cutting and improving the bottom line. The challenge for IT, however, is not simply to cut costs, but rather to gain visibility into which cost cutting strategies would most effectively increase value without damaging the business. But as IT transitions from supporting the “back office” to driving customer value, its progress remains hindered by legacy infrastructure, fractured processes and wasteful IT management practices. Waste abounds across the business service “production line,” and unless Enterprise IT Management strategies are applied to reduce it, the transformational aspirations of IT may never be realized. Worse still, unfettered cost cutting could damage IT to the point where it may not recover when the economy improves.

Opportunity

Applying “Lean” principles originally designed in manufacturing and perfected by the likes of Toyota and Motorola better enables IT to identify and eradicate anything that is wasteful within IT management. In the words of “Lean,” anything wasteful is work that adds no value to a product or service that organizations provide to their customers. And, since IT management underpins and orchestrates the production line of business services, identifying waste and removing it becomes a key imperative for business success. An Enterprise IT Management approach ensures success by pinpointing waste and reducing it across every phase of the business service lifecycle.

Benefits

Practically applying Enterprise IT Management to support “Lean” principles and strategies benefits an organization in many ways:

- The worst forms of waste — namely those that lead to poor customer service and lost business can be more easily identified and eradicated.
- Operations groups and personnel become more productive and less focused on fighting fires and operating in crisis mode.
- Organizations can use dynamic controls and automation to better exploit virtualization technology and further drive down escalating labor costs.



The Wasteful Business Service Production Line

Introduction: Lean IT

Lean¹ — adjective: offering little reward, substance, or nourishment: *the lean years*.

Lean² — adjective: (of an industry or company) efficient and with no wastage
Oxford English Dictionary

The recent economic calamities have shaken the fabric of many businesses, especially in the banking and financial sector. And with a recessionary cycle looming, the focus is shifting to cost reduction or, at best, conservative spending. As the saying goes, “Lean times calls for Lean measures.” Thinking lean, however, doesn't have to involve reactive cost cutting. Rather, many IT executives are exploring proven strategies and principles more familiar in manufacturing to minimize waste, drive out inefficiencies and, of course, reduce cost.

Lean pioneers and practitioners such as Toyota, Motorola, Xerox and Tesco recognized that any waste in the manufacturing of a product should be quickly identified and eliminated. Why? Because it adds no value to the customer, inhibits quality and reduces profitability. Today, what's come to be known as “Lean Manufacturing” or “Lean Production” or just simply “Lean” are the driving principles behind producing goods and delivering services that create value for the customer while minimizing waste and maximizing quality. Businesses now use lean principles and practices to produce goods and services with higher quality and fewer defects. This involves less human effort, less space, less capital, and less time than a traditional system of mass production.

But do principles that originated from manufacturing have a place in the management of IT services and the underlying technology infrastructure? By exploring traditional IT operations and the wasteful practices it often employs, the answer is most definitely: yes.

The Eight Elements of Waste in IT Operations

Primarily, the charter of IT is to develop, support and enhance business services that deliver value to the parent organization and its customers. Similar to manufacturing goods, the development of business services involves managing demand, prioritizing activities, marshalling finite resources and controlling defects. Across this business service production line there are eight elements within IT operations that add no value to the finished product or service.

Illustrated in Figure A, these elements of waste range from time spent managing defects (through, for example, fixing problems caused by unauthorized changes), to over-provisioning service capacity to time-intensive manual procedures that could easily be automated. Each element of waste considered independently is highly costly, but when aggregated together, these 8 elements could severely compromise IT's ability to support both internal and external customers on a sustainable basis.

Another major problem for IT is one of organization and control. While business services cross organizational boundaries and technologies, the IT organization often remains structured in a series of operational or technology-centric silos. Each of these silos uses its own management tools and methods to address perhaps just one particular aspect of wastage. But these fragmented efforts contribute little benefit since they lack the integration needed to manage cumulative wastage across the entire value chain.

EIGHT ELEMENTS OF WASTE IN IT OPERATIONS

ELEMENTS OF WASTE	EXAMPLES	BUSINESS OUTCOME
D EFECTS	<ul style="list-style-type: none"> Unauthorized system and application changes. Sub-standard project execution. 	Poor customer service, increased costs.
O VERPRODUCTION	<ul style="list-style-type: none"> Unnecessary delivery of low-value projects and services. 	Business and IT misalignment, increased costs; misuse of resources
W AITING	<ul style="list-style-type: none"> Slow application response times Manual service escalation procedures 	Lost revenue, poor customer service, reduced productivity.
N ON-VALUE ADDED PROCESSING	<ul style="list-style-type: none"> Reporting technology metrics to business managers. 	Miscommunication
T RANSPORTATION	<ul style="list-style-type: none"> On-site visits to resolve hardware and software issues. Physical software, security and compliance audits. 	Higher capital and operational expenses.
I NVENTORY (EXCESS)	<ul style="list-style-type: none"> Server sprawl, under-utilized hardware. Multiple repositories to handle risks and control. Benched application development teams. 	Increased costs: data center, energy; lost productivity
M OTION (EXCESS)	<ul style="list-style-type: none"> Fire-fighting repeat problems within the IT infrastructure. 	Lost productivity.
E MPLOYEE KNOWLEDGE (UNUSED)	<ul style="list-style-type: none"> Failing to capture ideas/innovation Knowledge and experience retention issues. Employees used for repetitive or mundane tasks. 	Talent leakage, low job satisfaction, increased support and maintenance costs.



Taken individually, each of the elements of waste illustrated in Table A can have a detrimental effect on business operations. Unfortunately, however, linkages across a business service supply chain result in a domino effect, whereby each waste element contributes to another. For example, a slow application response time problem (waste = customers waiting) might result in an increased volume of calls to the help desk (waste = motion; excessive and unproductive fire fighting) and might be addressed by over-provisioning additional computing capacity to fix the immediate problem (waste = increased costs and overheads). Not surprisingly all these compound effects result in the greatest waste of all — business **DOWNTIME**. An end-to-end, integrated approach to IT management is vital, therefore, to both identify waste elements in the business service supply chain and eliminate them.

Managing IT — The Lean Opportunity

The idea of using lean techniques to reduce waste in the manufacture of business services has been explored by some IT organizations. More often than not, however, its usage has been restricted to application development and maintenance.


Lean principles make sense in applications development. While many organizations continue to explore opportunities to offshore development to low-cost locations, the cost of developing and maintaining applications can still account for more than 50% of the IT budget. With labor costs so high, many IT organizations have reduced head-count to a point where further cuts will impact capability.

According to McKinsey & Company — applying Lean IT principles can increase application development and maintenance productivity by as much as 40%, while improving the quality and speed of execution¹. Why? Because the characteristics of an application development department are similar to those of a factory or production line, and each category of waste in manufacturing has a counterpart in application development (for example: rework due to application code bugs or overproduction from fulfilling enhancement requests that aren't immediately necessary). Also, application development has a number of activities which should be automated and linked to remove waste across the entire line and increase the flow of production.

Similar thinking needs to be applied in the area of IT operations, because like application development, IT operations can manage from a service lifecycle perspective; employing techniques and methods to better design, operate and transition business services in support of a broader business strategy. The new IT Infrastructure Library (ITIL®) V3 body of knowledge promotes this approach, and many organizations are starting to embrace it. Lean principles can supplement service management frameworks such as ITIL, since they too promote automating routine processes. And although Lean focuses on waste and the removal of it, the goal of increased productivity and higher quality service through continuous improvement remain the same.

Lean IT principles can increase application development and maintenance productivity by as much as 40%.... similar benefits can be achieved in IT operations.

1 McKinsey & Company, The McKinsey Quarterly, "Applying Lean to Application Development and Maintenance", Noah B. Kindler, Vasantha Krishnakanthan, Ranjit Tinaikar, May 2007.



Opportunities to apply lean principles and reap the benefits can be achieved from a number of IT management methods. These can be applied singularly, but when integrated, have a greater potential to minimize waste and its impact across the business service production line:


Visualize Business Services

A technique exists within Lean manufacturing called value stream mapping. Put very simply, it involves analyzing the flow of materials and information currently required to bring a product or service to a consumer. The idea behind value stream mapping is that wastage can be more easily identified when the flow of production is visualized. Although the technique originated in manufacturing, value stream mapping is becoming more common in service related industries, healthcare and also software development within IT.

Although IT operations professionals don't use the term value stream mapping, they've been using similar concepts for a number of years to better understand the relationship between technology components and business services. Like their manufacturing counterparts, IT analysts spend time building pictorial representations (or configurations) to better understand how the myriad of technology components — across networks, systems, databases and applications — contribute towards delivering a business service. Important too in this process is the ability to quickly identify fragile components that can contribute more waste and understand where opportunities exist to improve configurations.

Unlike manufacturing, IT doesn't have to resort to hand illustrations, Microsoft Visio diagrams or Computer Aided Design (CAD) drawings to visualize and automate IT management functions supporting a business service. Today's advanced technologies provide a much more efficient (and less wasteful) alternative. For example:

- **APPLICATION DEPENDENCY MAPPING AND A CONFIGURATION MANAGEMENT DATABASE** automatically discover and visualize technology (configuration items) and service relationships and dependencies. These advanced solutions provide capabilities that allow IT operations to detect even the slightest change in service components and so prevent perhaps the greatest waste of all — unplanned downtime and business service disruption from unauthorized changes. Additionally, when integrated with other IT management solutions, they provide even more opportunities to eliminate waste:
 - Instantly reveal excess technology (inventory) that adds no value to a business service.
 - Avoid wait times when resolving problems at a service desk by providing analysts and technicians with exact configurations, including: problem history, third party warranty and support agreements.
- **WORKLOAD AUTOMATION AND IT PROCESS AUTOMATION** Since the early days of mainframe computing, batch job scheduling has been the workhorse of IT operations. Traditionally, these tools required that batch jobs be defined with dates and times. Over time, however, the volume of computing workloads and their dependencies increased just as IT infrastructures expanded in size and complexity. In response to this, more advanced workload automation solutions have evolved to a point where they are dynamically triggered to run whenever resources are available. However, this often means that pre and post job processing can be very manual in nature and lead to more wastage.



Integrated IT Process Automation (sometimes called Run Book Automation) can solve this issue. By automating IT processes to respond to those job flow conditions, these solutions can reduce or eliminate pre- and post-processing manual activities. For example, it's not uncommon that a job within a workload will need certain resources to be available in order to run successfully. Processes defined using these solutions can be integrated directly within a workload to take predefined actions confirming those requirements are met prior to for example triggering the next job in a sequence. This type of advanced control provides more opportunities to become especially lean by reducing wait times and eliminating defects in operational processes.

Additionally, these types of solutions enable service management processes to be visualized and orchestrated across technical and organization boundaries, further advancing lean goals and accelerating adoption of best practices such as ITIL.


Develop Demand Management Processes

Great opportunities to gain the benefits of lean exist when organizations can optimize those parts of IT that work closely with the business. When executed correctly, activities such as new product requirements analysis, portfolio analysis and project management have the potential to increase business agility; more often, unfortunately, these functions are somewhat poorly designed and executed, leading to more waste.

The notion of demand management in IT is in many ways similar to pull processing in lean manufacturing. Here, manufacturers design their processes to be more responsive to the changing requirements of their customers. IT organizations have a similar opportunity to become just as agile when both the strategic and tactical demands placed upon them are optimized.

- **STRATEGIC DEMAND** includes demand for new projects and services that can fuel the innovation needed to drive business growth. Although in many organizations strategic demand only accounts for a small part of the IT budget (often as little as 10%), waste elimination opportunities should aggressively be explored. Here, techniques such as Project and Portfolio Management (PPM) can provide the business a fact-based process upon which to guide investment decisions and optimize project execution. From a lean perspective this is extremely valuable since it identifies waste at the start of the service production line (e.g. misaligned projects).
- **TACTICAL DEMAND** involves managing the daily demands placed upon IT. Demand here ranges from responding to help desk calls to dealing with change requests to provisioning or on-boarding a new employee. This demand is often known as “keeping the lights on,” and since it typically consumes between 80-90% of the IT budget, is a great area to apply lean thinking.

Service Portfolio Management provides IT operations with a process to deliver a broad range of services more efficiently and effectively. Here, IT utilizes service catalogs to document and describe all the services it provides, together with agreed-upon service levels and cost. Users submit requests to the service catalog via a standard web browser, and since these solutions incorporate automated workflows, each request is routed through its required approval cycle.



There are numerous cases across IT operations where the application of Service Portfolio Management can be especially lean. For example, a manager could access the service catalog to automatically initiate and co-ordinate a single process to on-board a new employee. This would perhaps involve requisitioning an appropriate PC, setting up an email account and granting access rights to applications. And, since the process is completely automated and workflow-driven, waste in the form of wait times, excess motion (manual) and lost productivity can be significantly reduced.

Understand Costs of Production

Another important way to obtain lean IT is gaining a complete understanding of the allocated costs of the elements required to deliver and support a business service. These consist of all the infrastructure costs — elements such as networks, servers, storage, software, and labor — indeed anything that contributes towards the cost of a business service. More often than not, however, such cost information is held in multiple repositories, such as spreadsheets and reports, making it difficult to determine the true cost of service delivery.


A better approach is to capture costs such as help desk support, email usage and desktop support and then allocate based on how they are consumed by business services. By doing this, organizations will not only better understand the total cost of delivering a service, but also the drivers to increasing IT costs. For example, accurately determining that a particular business service is consuming far more help desk resources than others will most likely be an indicator that defects exist within that particular service. In Lean parlance, defects equal waste and would be an obvious area for further investigation in order to enact reduction strategies. Other examples include knowing what it costs to deliver an email service (by employee, by department), or being able to compare infrastructure unit costs (e.g. blade server vs. virtual machine).

In addition to these tactical examples, a detailed understanding of the cost of production enables more strategic opportunities. For example, clear insight into how the cost of delivering in-house services compares to software-as-a-service (SaaS) models, industry benchmarks or outsourcing contract benchmarks enables organizations to pursue and negotiate more favorable licensing terms.

Perhaps one of the greatest strengths of this approach is that it helps avoid the greatest waste of all — cutting costs in areas where they shouldn't be cut. In times of economic decline, it's essential for IT managers to have true cost visibility, because without it, IT is powerless to prevent cost cutting that will be detrimental to the business in the longer term.

Proactively Manage Resource Capacity

One of the biggest areas of waste in IT today is in the usage of physical infrastructure. It's a well documented fact that a typical server may only ever run at 25% or less of its full capacity. But, with increased pressure to maintain 24x7 operations combined with rapidly falling hardware prices, more effective stewardship of IT resources has become a secondary concern. This is of course changing as organizations seek to drive down costs through data center consolidation and to "go green" by reducing energy consumption.



Virtualization does of course present many Lean IT opportunities, especially since it helps prevent waste from overproduction (basically buying more hardware when not necessary). Unfortunately, however, this technology adds an additional layer of complexity that can substantially add to waste in other areas (for example higher labor costs through the need to acquire specialized skills). In a recent report by McKinsey & Company² it was identified that although the cost of managing servers has fallen significantly since 2000, the cost of labor remains about the same and is now almost two-thirds the total cost. This suggests that organizations haven't yet optimized or sufficiently automated the management of hybrid virtual and physical environments and that additional efficiency can be realized.

As an example, provisioning new virtual machines based on capacity demands from the business still involves many disparate and labor intensive activities. First, technicians have to detect changes in performance across networks and systems and then relate these observations to other operational staff that would perhaps use another set of tools to provision more capacity. Obviously, this is very wasteful and inefficient.

A far better approach is monitoring performance at a business service level and dynamically provisioning capacity when it's needed. For example, in an Enterprise IT Management scenario for online retail shopping, where high availability is critical, the system would monitor when performance falls below a business threshold and then automatically respond by provisioning new capacity — be that a new server or additional virtual images. Alternatively and when workloads diminish, this approach would remove the additional capacity, returning them to a pool or using them elsewhere. Of course, providing this level of control not only requires a highly automated solution, but also the ability to incorporate business policies and a level of intelligence missing in traditional management methods.

Thinking Lean with Enterprise IT Management

The Benefit of Integration

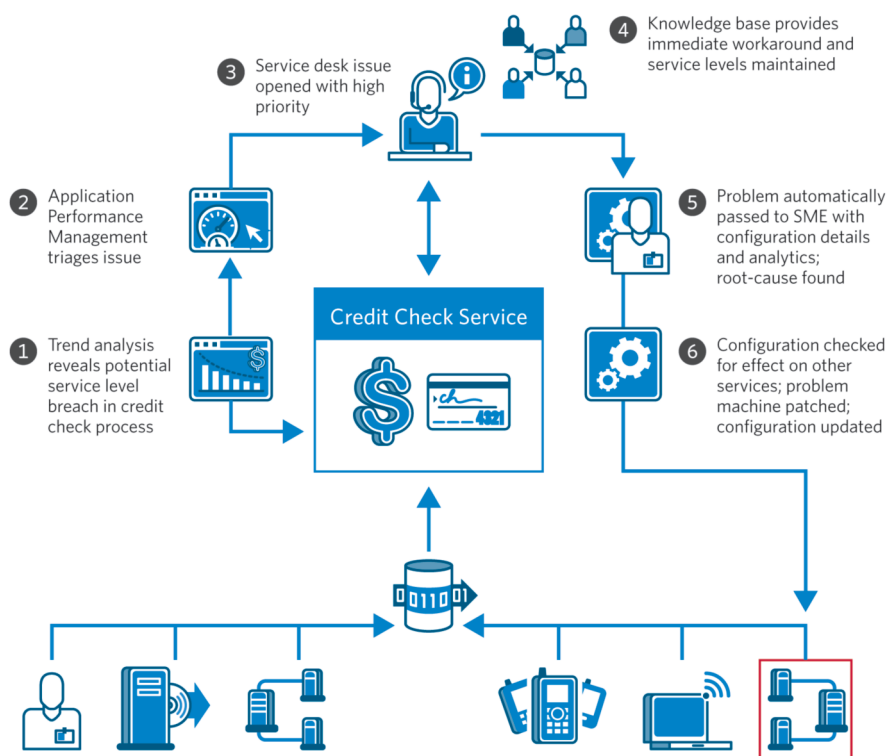
The opportunities discussed above present IT operations with many opportunities to reduce waste and hence lower costs across the business. In itself this is beneficial, but the real value of Lean IT thinking comes when organizations can leverage integrated methods to not only lower the cost of service delivery, but also increase utilization rates and customer service enterprise-wide.

Consider Figure A, which presents an integrated approach to managing service experience. Here, opportunities abound for applying Lean IT in the identification of waste and in its elimination:

² McKinsey & Company, The McKinsey Quarterly, "A Fresh Wind for Offshoring Infrastructure Management", Vivek Pandit and Rajesh Srinivasaraghavan, October 2008.

FIGURE A
Integrated enterprise IT
management capabilities
enable waste to be
quickly identified and
eliminated.

SERVICE EXPERIENCE MANAGEMENT — LEAN THINKING APPLIED




LEAN STEP 1 Trend analysis reveals a potential service level breach in a credit checking process associated with a sales order application. Since performance is being monitored from the customer’s perspective, waste in the form of lost business from slow response times and poor transaction throughput can be quickly identified.

LEAN STEP 2 Integrated Application Performance Management triages the cause of the problem within the stack of technology supporting the service. This avoids wasted motion and lost time resulting from multiple teams (network, systems, database) trying to determine the cause of the problem.

LEAN STEP 3 Integration results in a service desk issue automatically being opened with policies for urgency and impact used to prioritize the problem.

LEAN STEP 4 Online knowledge base provides the service desk analyst with an immediate workaround from which to restore service. No time is lost trying to determine recovery procedures or fire-fighting the problem.

LEAN STEP 5 Service details held in a configuration management database automatically routed to subject matter expert together with problem analytics and root-cause.



In a recent white paper conducted by IDC³, organizations who implemented integrated IT management solutions to drive many of initiatives discussed in this paper gained a 433% return on their initial investment over a three year paper.

LEAN STEP 6 Visual configuration maps checked to determine whether the permanent resolution or fix will affect other services. This prevents service defects resulting from unplanned changes. Finally, automated software delivery is initiated to patch the problem machine.

As this simple example illustrates, integrated IT management has delivered a number of tangible benefits:

- The worst cause of waste — slow customer response times have been immediately identified, with a series of actions and workflows co-coordinated to address it.
- Excess motion in the form of unnecessary problem analysis has been kept to an absolute minimum.
- By engaging subject matter experts only when they are needed, highly talented and skilled technicians become highly productive and are leveraged more effectively across the business.
- Further defects from badly conceived and reactive crisis management are eliminated completely.

Although this is a rather simple example, it perfectly demonstrates how Lean IT thinking and the use of integrated IT management can yield substantial benefits to IT operations. Clearly, if the same productivity improvements can be obtained within IT operations by thinking Lean, as have been by realized in application development (as much as 40% according to McKinsey), then a huge opportunity exists to dramatically reduce the biggest cost item in IT today — ongoing operations. Indeed, and in a recent white paper conducted by IDC³, organizations that implemented integrated IT management solutions to drive many of the initiatives discussed in this paper gained a 433% return on their initial investment over a three year period. Significantly, the greatest benefit was in the automation of IT tasks and the subsequent increase in IT productivity, which accounted for approximately 61% of the total benefit (\$76,000 for every 100 users).

Conclusions

While the benefits of thinking and acting “Lean” have been widely adopted in manufacturing over many years, its use in IT is just as appropriate. Today’s IT organizations no longer focus on managing technology, but rather run and optimize a continuous business service production line. And like every production line, waste can surface everywhere. Organizations should employ integrated methods, technologies and advanced levels of automation to rapidly identify the causes of waste and eliminate them. Those that are successful will not only drive down costs, but also be better positioned to lead business and economic improvement.

³ IDC White Paper sponsored by CA, Improving IT Economics and Gaining Business Value with CA Enterprise IT Management Software: An ROI Study, Doc # 214817, November 2008



About the Author



Peter Waterhouse has been involved in the development, support and marketing of IT management software products for more than 20 years. He has held a number of consulting, technical sales and marketing positions in such areas as network and systems management, application management and IT service management. Mr. Waterhouse writes regularly about business technology issues and is the author of many white papers and articles and is currently an Advisor in Enterprise IT Management Strategy and Marketing at CA.

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