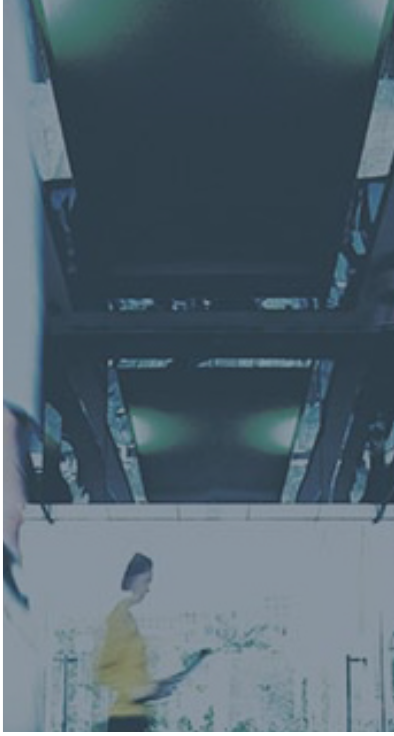
How to Leverage Metrics to Support ITIL Processes



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George Spafford is an experienced executive consultant in business and IT operations. He is a prolific author and speaker, and has consulted and conducted training on strategy, IT management, information security and overall process improvement in the U.S., Canada, Australia, New Zealand and China. His publications include hundreds of articles plus the following books: "The Governance of Green IT", "Greening the Data Center", "Optimizing the Cooling in Your Existing Data Center" and co-authorship of "The Visible Ops Handbook" and "Visible Ops Security".

What Are Metrics?

By George Spafford

If you go to an ITIL conference these days, you can pretty much predict that any session on ITIL process metrics will be packed. This seems to reflect a general level of anxiety and seeming mysticism about what metrics are and how to utilize them. Groups attempting to use metrics tend to have their efforts fall in a broad spectrum from total irrelevancy to extremely valuable. Of course, everyone would like to select, design, and utilize metrics that are meaningful. The intent of this eBook isn't to provide a framework for metrics, but rather to provide some perspectives on metrics that the reader may find helpful to consider to increase the likelihood of success.

A process is a collection of tasks assembled in a particular way to achieve an objective that should, when properly designed, supports the goal of the organization. To ensure that processes continue to support the organization, we must understand how the overall system and each individual process are performing over time as changes will be needed for a variety of reasons.

To this end, we can collect two types of data about the process – qualitative and quantitative data. Qualitative data are subjective descriptions/interpretation of events and status. While qualitative data provides one dimension, it is hard to trend and compare.

We can also strive to develop numeric representations of some observable state of a process. This includes direct measures and formulas. As such it lends itself to graphing, trending, and mathematical analyses. When coupled with qualitative data it provides another dimension.

You need to be very careful not to fall in a trap and take the absolute stance that quantitative is better than qualitative. There are situations where one will have advantages over the other form. Additionally, just because something is a numeric doesn't mean it is right. There are many types of errors that can enter in during measurement, design and calculation that can result in metrics that are erroneous.

With that said, metrics are critical to monitoring processes and care must be taken to select and design the correct metrics.

Key Process Indicators (KPIs)

Management must identify process metrics that are particularly important to the organization. These are known as "key process indicators" (KPIs) and they should be carefully selected, designed, implemented, and monitored. IT must avoid the trap of providing volumes of metrics hoping someone finds value and instead focus efforts as much as possible. Ask "Is this vital to process control based on what we want to accomplish or is this metric something that we are generating simply because we can?"

For example, Change Management is a process used to manage the risks associated with changes in the IT environment. There are literally dozens of potential metrics with countless design variations that can be generated. If one of the objectives of IT is to stabilize the production environment, then one key process indicator to carefully monitor is the change success rate. The reason for this is that as the change success rate goes down, so does IT service availability while incidents and levels of unplanned work increase. Armed with this information, management should take corrective actions if the change success rate begins to go down at the individual, team, technology, or overall levels.

The point of the example is that IT must understand requirements, select meaningful metrics, and then use proper analysis to take action. One must always ask, "If nothing ever results from a metric, then why is it being used?"

Metrics Influence Behavior

In conjunction with the monitoring of process performance, metrics also influence behavior. If employees understand what management is monitoring then that will affect what they do and how. Then, if those metrics and targets are incorporated in job descriptions and compensation, performance is influenced even further.

Note that confusing metrics and/or the setting of targets that are impossible for employees to hit can create frustration and ultimately be detrimental. The impacts of metrics and management actions, or inactions, to the organizational must always be taken into account.

KPI Selection

The need isn't to just identify how to measure a process but to really focus on what to measure and why. In other words, the decision to buy a metrics book, a reporting tool, and then generating a large report is not sufficient. In fact, most people will not even bother looking at a report more than a few pages long so the outcome of giant reports is typically counter-productive. Thus, rather than generating volumes of useless content in the mistaken belief that people will hunt for meaning, IT process owners and managers must take care to select metrics that matter – metrics that are relevant to stakeholders.

This guide explicitly splits selection and design into two parts because it is too easy to say we will implement a metric by some name and then have misunderstandings about how it will be calculated, where the data will come from, the polling frequency, and so forth. Thus, this document explicitly encourages the reader to think in four steps:

1. What is the objective(s) of the process?
2. What do I want to measure to either pursue or protect the objective(s)?
3. How will I design the metric to achieve what needs to be done?
4. How can I validate that the results and outcomes are correct?

These four steps are relatively high-level and are intended to help plan what to do. The following items build on and complement the thought processes around metric selection:

Objectives

When identifying metrics to use, first and foremost you must understand what the objectives are. The metrics must support the specific objectives of the process in the organization. For example, if the desire is to stabilize production then the number of incidents, percent available, and the opportunity costs (for example, lost sales) of the outages would all be good to know.

Create a Metric System and Not a Mess

A systemic perspective is important. No one metric tells the whole story. There must be layers of metrics that can help explain what is going on. If the average time to close an incident is increasing, then is that bad? In isolation, one could think that the incident management group is not performing. Instead, if we look closer and understand that problem management has been eliminating a substantial

portion of the easy repetitive incidents and as a result, the mathematical average is increasing, then this isn't bad – it's to be expected – provided one understands the relationship between the metrics and what is being observed.

These relationships can be used to validate findings and explain observations. It is a good idea in general to have validating, or supporting, metrics than can corroborate measurements around critical states.

High-level Metric Relationship examples:

- As the change success rate goes down, unplanned work goes up, project backlog increases, service availability decreases, service performance decreases, customer satisfaction decreases
- As incident volume increases, project backlog increases, project budgets are negatively impacted, project deliverables are negatively impacted, project schedules are negatively impacted, customer satisfaction decreases
- As the number of non-standard builds decreases, the mean time to repair (MTTR) decreases, average time to provision a new build decreases

Overemphasis of metrics in isolation can also cause problems. To highlight this, let's look at the first fix rate metric. It seeks to establish how many calls are resolved the first time. If staff is compensated on this metric alone, there could be a tendency for them to hold on to calls and not escalate accordingly in an attempt to keep their first fix rate number high. As a result, callers may get frustrated as the service desk person tries many different things in an attempt to solve the problem resulting in protracted outages and customer satisfaction issues. In this example, that really does happen; the emphasis on the first fix rate metric in isolation had unintended consequences.

Not Everything is Measurable

Bear in mind that not everything is measurable and that the whole story cannot be told solely with numbers. People mistakenly attribute Deming as saying that you can't manage what you can't measure. In fact, he observed that not everything in an organization is observable or measurable. The reason for this comment is that despite the best designed metrics system there will be events that defy measurement and care must be taken to not solely "fly by numbers."

IT management must still talk to customers in the business and users of IT services. While many like to deal with "hard numbers" vs. subjective data, the soft data cannot be ignored when measuring the health of IT overall or individual processes.

Data Collection Limitations

There are two considerations to bear in mind. First, existing monitoring tools will have limitations that must be taken into account. There will be a need to identify the gaps between what is desired versus what is feasible and then decisions made about the gaps. In some cases a new metric may be identified and in others, they may add to the need to upgrade capabilities.

The second consideration is more of a warning – do not spend more money on collecting a given type of data than the data is worth. For example, it is one thing to increase a given manual transaction with the desire to address a significant concern. It is quite a different case to increase a manual transaction frivolously where the value does not justify the additional costs.

Actionable Metrics

One gauge to determine the usefulness of a metric is to review what action, if any, could take place if a threshold is reached. If targets and actions cannot be defined for a given metric then odds are it is not particularly relevant for the organization. Rather than risk losing stakeholder attention, irrelevant metrics must be avoided. Moreover, if a metric becomes irrelevant over time then it should either be removed or its design updated accordingly. ■

KPI Design

By George Spafford

Moving beyond the selection of a KPI at a high-level, the exact design of the metric must be formally designed, communicated, negotiated, and implemented. If ever there was an area of ambiguity that must be stamped out, it is that of metric design. To measure and report accurately and timely requires clear unambiguous definitions of the exact construction of a given metric, the sampling rate, potential for error, and so on. The need for clarity cannot be stressed enough!

To illustrate the need for clarity, let's look at the measurement of availability. Imagine you are requested to measure availability by senior management. That seemingly simple request can be anything but simple to address. Years ago, IT measured availability by doing PING sweeps. Over time we realized that the TCP/IP protocol layer could be alive and respond to a PING while the service that really mattered was frozen, thus throwing off what IT reported relative to what users experienced. Plenty of arguments erupted as a result and the industry moved to measuring availability via synthetic transactions that mimicked user activity and could better capture both availability and performance data relating to the entire IT service chain and not simply technical measurements around discrete components. To correctly measure availability required not just a shift in technology, but also clear definition of each transaction type, the sampling rate, understanding the performance impacts to the service, and so forth. Without a clear understanding, the critical concept of availability can become a point of contention between IT and the business and even a source of conflict within IT.

A simpler example is the change success rate. At a high level, it is the number of successful changes divided by the total number of changes x 100 to get a percent. Again, easy to write but there are some very significant details here – what constitutes a successful or failed change? A change that can be implemented according to plan without causing an incident or problem record to be registered is a successful change. Even with this definition there will be questions about who can say a change went in successfully, how changes will be related to incident and problem records, etc.

Details must be defined and acceptance brokered. Without ensuring the metrics are relevant and there is clear understanding of how they are calculated, process improvement efforts, indeed all of IT, can suffer dramatically. KPI design can be one of the most difficult aspects of process design as the KPIs will often become part of performance reviews and compensation plans.

KPI Reporting

For collected data to be useful, it must be presented to the individual recipient in a manner that is relevant, timely, and efficient. As mentioned previously, a 100-page generic

report will not be read because people do not have the time to try and derive some level of personal value. In contrast, a focused one to two-page report, or dashboard-style Web page, tailored to the recipient's needs, will repeatedly be read and appreciated. Indeed, if senior management gets useless reports, then they are very likely to question the value of the person(s) sending the reports and not just the value of the reports.

Relevancy

To be relevant, a report must be delivered to the right person, at the right time, in the right format, in the right language, and formatted correctly such that the reader gets value. That means that time must be spent up front to define reporting requirements not at a stakeholder level. What does the CISO need? What does the head of data center operations need? Shall it be delivered in hard copy, e-mail, or via an on-demand Web page? Does it need to be generated daily, weekly, monthly, or on-demand? The potential requirements need to be identified and addressed.

Because reporting is so critical, it is a very to see design teams discuss the outputs with stakeholders and use report design as a method to arrive at metric selection and even some of the high-level metric design issues. As the level of the organization reported to gets higher (say a VP or a C-level person), then it is a wise idea to brainstorm and select metrics and establish the metric designs and reports that are then reviewed with those stakeholders. Asking an executive what they want without any models or prototypes will likely be very frustrating to everyone involved and should be avoided.

Reporting Using Percents and Absolute Numbers

One problem that sometimes surfaces is when to use percents or absolute numbers. Percents are good for trending and comparisons. Absolute numbers can communicate volumes and help the reader to understand magnitude or scale. For example, a 100 percent change success rate sounds good, but what if only one change was processed in a month? In that case the success rate isn't so impressive and the change volume should be viewed as highly suspicious. If someone reports that the change success rate is 90 percent and that 2,200 changes were implemented, then the reader can better understand what that percent really means.

Statistical Process Control (SPC)

A single value at a point in time doesn't help the reader understand if the process is healthy or not. To trend the data over time is one approach but very limited. An aspect of reporting and analysis frequently overlooked by IT is the use of statistical process control methods and charts to track measurements over time and interpret the results. There is a wealth of proven techniques to determine if a process, service, or even a discrete component is in control, out of control, or trending in a direction that could lead to an out of control condition.

KPI Continuous Improvement

IT processes will need to change as needs of the organization change. At the same time, the metrics used will need to evolve as well. Some metrics will no longer be necessary, others will come to the fore and some calculations will evolve.

In order to continue to meet the needs of the organization, processes should be reviewed at least annually and after each major organizational or process-related change, such as merger and acquisition activity. Additionally, part of the formal process review must include metrics and reporting.

Sample Process Metrics

No book on metrics can exist without some sample metrics. The following are presented for your review and discussion with your process improvement teams. It's up to you decide what is relevant, how to design the metric and generate the reports!

Change Management Metrics

This process is tasked with managing the risks of making a change and not making a change. Metrics need to reflect the need for speed and agility tempered by the need to safeguard production and the business.

Consider the following:

- Changes submitted to Change Management
- Changes in process (meaning these are the changes current flowing through the process but have not yet either been implemented or rejected)
- Changes rejected
- Changes successfully implemented
- Changes aborted during install that required a rollback
- Rollback plans that failed
- Failed changes
- Failed changes that caused a SLA breach
- Failed changes that caused an availability loss
- Amount of sales lost due to failed changes[1]
- Total costs to correct failed changes[2]

Service Asset and Configuration Management (SACM)

This process is concerned with the management of IT's logical view of the world. Its main value-add is in providing accurate timely data to other process areas.

- Configuration items (CIs) under management
- New CIs added to the Configuration Management System (CMS)
- Changed CIs in the CMS
- CIs audited
- CIs determined to be accurate from audit
- Unauthorized CIs detected
- Incidents caused by inaccurate CIs
- Problems caused by inaccurate CIs
- Failed changes caused by inaccurate CIs
- Revenue lost due to inaccurate CIs
- Costs incurred due to inaccurate CIs

Release and Deployment Management

This process is tasked with managing the insertion of new and changed services into production such that effectiveness and efficiency are maximized and risks minimized. As such, the following metrics are relevant:

- IT services with conforming to the release policy
- Releases conforming to policy
- Emergency releases
- Number of releases in process
- Releases behind scheduled
- Releases exceeding budget
- Releases implemented on schedule
- Releases implemented within budget
- Number of standard releases
- Average release life
- Releases implemented with the defined feature set
- Releases that caused incidents
- Releases that caused problems

Incident Management

This process is concerned with anything that impacts, or may impact, the standard operation of an IT service and then timely restoration.

Sample metrics to consider include:

- Number of incidents
- Incidents resolved within service level agreement (SLA) targets
- Sales lost due to incidents
- Mean Time to Detect (MTTD) incidents
- Mean Time to Repair (MTTR)
- First fix rate
- Incidents incorrectly assigned
- Incidents matched to previous incidents
- Incidents solved via knowledgebase
- Customer satisfaction

Problem Management

This process is concerned with identifying the root cause of incidents in a manner that makes business sense. In some cases, problem management will identify solutions and in others workarounds.

Potential metrics include:

- Open problem records
- Incidents resolved by known error
- Incidents resolved by solution
- Incidents linked to problems
- Average time to close a problem
- Trends identified
- Proactive problems identified
- Availability Management

This process is tasked with defining requirements, as well as the monitoring of, IT service availability.

Potential metrics include:

- IT service availability from the user's perspective[3]
- Availability related incidents that breached SLAs
- Mean Time to Detect (MTTD) incidents
- Mean Time to Repair (MTTR)
- Lost sales due to outages
- Costs incurred due to outages

Capacity Management

With concerns over sustainable computing and investments in IT, capacity management has experienced a re-awakening. It is tasked with ensuring that computing resources meet customers' needs in a manner that makes business sense.

Sample metrics include:

- CIs with defined capacity requirements
- CIs tracked in the Capacity Management Information System (CMIS)
- Unplanned IT hardware purchases
- Unplanned software purchases
- Unplanned facilities purchases
- Percent of Capacity Plan spent to date
- Variance of actual purchase cost compared to planned purchase cost
- SLA breaches caused by capacity constraints
- CI utilization
- Power Usage Effectiveness (PUE)
- Data Center Infrastructure Efficiency (DCIE)

Report Relevancy Flags

There are a couple of flags that can help identify if metrics are relevant or not. First, if nobody ever discusses the results of a report, then something is wrong! That may indicate that the report should be removed, replaced, or revised. Ask for feedback and encourage candor. Nobody benefits from irrelevancy.

The second flag involves action based on reports. If a particular report never results in action, then why produce it? It may be that a given metric has outlived its usefulness or that other metrics and supporting data are needed to substantiate whether action is needed. Whatever the case, it should be investigated and then corrective action taken.

Service Level Management

This key process negotiates service level requirements with the business, creates formal service level agreements (SLAs), reports progress and launches service improvement programs.

Sample metrics include:

- IT services covered by SLAs
- SLA breaches
- Service level targets at risk
- Operating level agreement (OLA) breaches
- OLA targets at risk
- Underpinning contract (UC) breaches
- UC targets at risk
- SLA reviews completed on schedule
- Quarterly business reviews conducted on schedule
- Service improvement plans launched
- Service improvement plans closed with successful results
- Service improvement plan expenditures
- Customer satisfaction

With ITIL v3 there are 26 processes and this sample list could go on and on. Instead, apply the principle of understanding what your organization is trying to achieve with each process and then select and design metrics and corresponding reports based on the need to understand the health of the processes and IT overall in order to help stakeholders make effective and efficient management decisions.

Conclusion

Metrics need not be viewed as an arcane dark art. Instead, the use of KPIs should be grounded in measuring the progress towards, and protection of, the objective(s) of a process. If the objective is clearly understood then the identification of metrics and how they should be constructed become much more apparent. In addition, it helps to bear in mind where the processes are at in terms of adoption in the organization and the behavior that the metric may drive. Understand what stakeholders need and tailor metrics and reports accordingly. It is far better to start focused and evolve KPIs and reporting to stay relevant and truly help stakeholders with their management decisions. Hopefully this document has given you some ideas to discuss in your teams and improve the value that metrics bring. ■

Endnotes

[1] Note that while this says "sale" another perspective is lost units of the organization's goal. It could be tracked in terms of patients, students, and so on.

[2] Differentiate between economic (opportunity) costs and true accounting (hard money) costs. Do not comingle the two types of costs.

[3] As previously mentioned, overall IT service availability must be based on users' perspectives – not via methods such as PING or on discrete components.