Capacity Management in a can
(Open, Heat, Serve, and Succeed)
I will cover four distinct areas:

- **Background** - This section will cover my experience as a capacity manager, my relevant education (ITIL), and will cover the potential (and potentially scary) triggers that would force a company to quickly implement a capacity management process. I will specifically cover the details of the event (a merger/acquisition) that led to this paper.

- **Setting and executing a game plan (with guidance from ITIL)** - Implementing a capacity management process over a long period of time isn’t easy. Putting the pieces in place to get results in a fraction of the amount of time usually required forces the staff or the consultant to have a strong project plan in place. This section will cover project management as well as trying to align to the good practice of ITIL.

- **Dealing with challenges (with apologies to ITIL)** - Compressed timescales aren’t the only challenge one faces during a merger/acquisition. This section will talk about the technical challenges as well as the personality challenges as well as dealing with people looking at the problems and questions from different angles.

- **While a project may be short-term, ongoing Capacity Management is certainly desirable** - This section will look at moving from the successful completion of a specific, time-compressed project to a long-term view of having an ongoing Capacity Management process.

**Background**

My first position out of graduate school was as a Unix Capacity Planner. Over the course of my career, I’ve worked in varied industries, including an electric utility, an overnight shipping company, and an insurance company. Each presented significant challenges, technical and otherwise, but all of those companies had reasonably mature Capacity Management processes.

As I moved into consulting and also spent time working for a software vendor, I found out rather quickly that process maturity is NOT the norm. Most companies I dealt with, and deal with, do not have a mature Capacity Management process. Many do not have basic tools in place to do effective Component Capacity Management (more on this when I talk about ITIL and implementing the process).

I took the time and effort to become an ITIL (v2) Service Manager and an ITIL (v2) Capacity Practitioner and an ITIL (v3) Expert because I quickly learned that a framework for best/good practice was invaluable in implementing a Capacity Management process. Knowing such a framework well allows the decision makers to know what parts of the ITIL processes are necessary and those that can be deferred until the project isn’t as time sensitive.

Finally, I took a few years to go to business school because my belief is that the most effective Capacity Managers are not just good technical people, but also work well with the business.
If you’ve been around the work world for a period of time, it’s almost certain you’ve been through at least one of the following events.

- Layoffs
- Reorganization / New Management
- Mergers
- Acquisitions

Many of us have been through more than one and some of us have been through all of them.

They all have one thing in common – a lot of uncertainty. Firstly, most people from senior management down to staff wonder if their positions will be eliminated. While this is obvious during one of these events, what’s less obvious is how such uncertainty will affect how people work and how new initiatives (such as a new Capacity Management process or the acquisition of tools) will be received. It’s quite possible in a merger and acquisition scenario that funding for upcoming or existing projects will be frozen while management figures out the direction the “new” or changed company will take.

We’ll revisit this later when we talk about personality conflicts between teams, especially if one comes from the “legacy” company and one comes from the “new” or “acquiring” company.

Having been through a few mergers and acquisitions, it’s clear to me that they are rarely a combination of equals, especially in the area of IT.

**The direction of IT is usually set by the remaining management** - those who came onboard from the “other” company have to figure out how to stay relevant in the new company.

**Two mature companies (in the area of IT) means that each has its own ideas of what “best practices” actually are** - IT Service Management processes are likely in place in each of the companies and it’s likely that the resulting teams will not simply be a combination of the existing teams.

**Technology, tools, applications, services** - there will be a lot of redundancy and overlap in all of these areas. Decisions will need to be made on which of these will survive the merger/acquisition.

Much will be said about the challenges of a merger/acquisition when we look at the case study later in this paper.
Capacity Management Activities

Activities undertaken as part of the Capacity Management process include the Iterative Activities:

- Monitoring
- Analysis
- Tuning
- Implementation (under Change Management)

These are ongoing activities that occur in the production environment in a cyclical nature in order to ensure services are meeting service level requirements and are constantly improved.

Demand management - (elevated to process status in v3) is really a business activity – increase capacity or manage user demand.

Modeling - consists of a group of techniques used to predict future performance based on predicted workload change or hardware configuration change.

Data is stored in a Capacity Database (v2) or Capacity Management Information System (v3). The key deliverable for the process is the Capacity Plan – a document (or series of documents) that communicates the observations and recommendations of the Capacity Management process.

Storing data in the CMIS - data is stored in a Capacity Database (v2) or Capacity Management Information System (v3).

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Case Study Telecom Merger & Acquisition

I was asked to manage a project where a telecommunications company would be

- Converting customers from a previous company to combined existing applications
- Dealing with anticipated growth and further acquisitions.

The goal, short term, was to ensure that these conversions would happen while still meeting existing service level agreements. A longer term goal was to put a capacity management process in place in order to be better prepared for the organization to handle these challenges going forward.

A key part of this project was to ensure that key applications would have enough capacity to handle the conversion of acquired customers. As part of the negotiation process, about two dozen applications/services were identified and prioritized. These applications were complex, multi-tiered, customer-facing applications, many of them web based.
Before agreeing to the timescales, it was necessary for us to figure out how much work (prep, scoping, actual modeling and predictions, delivery of results etc.) needed to be done for each application. While part of the goal was to implement a Capacity Management process, it quickly became obvious as time grew shorter and shorter that complete implementation of a capacity management process was impossible and that the main goal was to deliver results for the identified applications.

The following question is from a sample examination used in the v2 ITIL Capacity Management Practitioner course.

‘Which of the following is NOT an appropriate short-term objective for Capacity Management?’

- Develop and document a functional spec
- Implement an integrated set of CM tools
- Discuss roles and interfaces with other SM processes
- Document the scope, objectives, and terms of reference for CM

As a believer in aligning a Capacity Management process to ITIL and as someone who has taught the Practitioner course and delivered training and consulting designed to help companies develop their SM processes and align their practices to ITIL, I knew that implementing an integrated set of CM tools was not considered a short-term objective.

And yet the first task required in this project, as identified by a Gap Analysis performed before the project was agreed to, was the implementation of a CM tool, as nothing existed in the environment to capture historical component data. Before we discuss this piece of the project, let’s back up and talk about implementing Capacity Management. Normally, the process itself should be built and that process should lead to the purchase of tools. As I’ve already mentioned, this wasn’t a typical process – it was driven by specific need and the timescales were very compressed.

Implementing Capacity Management

Implementing Capacity Management, or any Service Management process, is not something that is done without proper planning. Indeed, it’s a project and project management discipline and resources are required if you are to be successful. Having someone in place as a project manager who is familiar with PMP or Prince2 will increase the potential for success in the project.

It’s necessary to have a sponsor – a champion – someone who will push others to cooperate and someone who has enough pull in the organization (either by organization chart or by the ability to get things done – or both) to get the required changes put in place.

A project team will likely consist of the Capacity Manager and a team of people who will implement the process. This could be the eventual Capacity Management team or could be a team who is skilled in implementing ITSM processes.
Someone must own the Capacity Management process. It is likely that the Capacity Manager, but in reality it could be anyone at this stage, is responsible for getting the process implemented.

Implementing a process is not something that can be done for free. Project cost, the cost of tools, people, accommodation, etc. are all non-trivial costs.

What’s the scope of the process? Will it cover everything in the organization or just a subset (mainframe, Unix, Windows, virtualization, storage, etc.)?

Implementing a process that will yield results is a “selling job” for the organization and for IT. A clear mission and vision statement allows for clear communication. One recommendation I always make is that everyone working within this process should be able to quickly describe what Capacity Management does – an elevator pitch – something that can be communicated in less than a trip up or down the elevator.

Any project should have SMART objectives – specific, measureable, achievable, realistic, time-based. Implementing a CM process is no different. What is the specific outcome of the project? How will you measure success? Is it an achievable objective? Is it realistic? When will it be completed?

A formal communication and awareness campaign should run as the process is being implemented – this will keep the process in everyone’s mind and will allow the Capacity Manager to communicate progress (which is especially important, considering the implementation of a process is not a short term project and it’s easy for people to forget there’s an active project in place unless progress is regularly communicated)

Gap Analysis

Normally, the first step in a project is to complete a Gap Analysis. The methodology is to interview and interact with a company’s IT staff and management.

The first step of a Gap Analysis is to use a variety of interview questions and assessment checklists (I’ve developed my own over time) to identify the good and bad in current practice. From there interview management to determine a profile of good practice for Capacity Management that the organization would like to achieve. At this point, I would take the two views – current and desired – and then compare this with my understanding of good practice and determine which pieces of this would be a good fit for the organization.

While this normally happens as part of the project itself, I quickly identified on this particular project that I would need to conduct a good portion of this Gap Analysis prior to the formal beginning of the project itself.

The next goal is to look at ‘Where do we want to be?’

- Improvements
- Benefits
- How to implement
- Project plan – timescales, staffing, costs, activities, outputs
Setting and Executing a Plan

Tailoring the Gap Analysis

- Consider the required CM data
- Figure out which data is available
- Recommend/implement tools to fill the data gaps
- Consider the rest of the Gap Analysis (for the CM process) after the first set of deliverables

I knew that we would need to deliver results in about 3 months from the formal start of the project. This is not enough time to commit to delivering results, and THEN do a detailed Gap Analysis.

Furthermore, I was uncertain that we would be able to meet the required timeframes – a Gap Analysis and a commitment to change takes time – and what if I didn’t think we could fill the gaps quickly enough? Also, any recommended changes we needed to be successful would need to be written into the agreement – without those changes we would not be successful and I needed to ensure we were putting ourselves in the best position for success.

So, I decided to break the usual Gap Analysis into two parts. I was most interested in whether Capacity Management tools would need to be installed and whether there were existing tools in place that we could leverage to help with the decisions and recommendations we’d have to make in less than 90 days. So, with apologies to ITIL (more on this later), I decided to worry about the tools and data first and the process itself later.

Hint: The apology to ITIL is mainly because the tools should not (usually) drive the process – however, with only 3 months to complete the project, it’s impossible to do a proper analysis and rollout. Sometimes practical considerations have to override the usual notion of good practice.

The Tool had to be tested and approved - As (on this occasion) we were bringing our own tool to the project and installing it into the company’s production environment, we had to prove that the tool didn’t consume excess resources and would work as advertised. This caused another delay, the group that did the testing work wasn’t the group that was our immediate consumer and it took weeks for the tool to be tested. Remember to factor this type of delay in where you can. By the time we had the go-ahead to install the software (and the capture agents) in the production environment, we had only 2 months left to complete the project!

While a few consultants were brought in to install the capture agents and the software in order to capture component level detail in the production environment, another consultant and I interviewed about 20 teams and captured as much information about the applications as we could. More on this later...
Getting Data and Information

Two consultants were deployed to work with the company’s staff in order to get capture agents installed on about 100 targets. These included mainframe, Unix, Linux, Windows, and VMware targets.

Part of the challenge is always to have the cooperation of the administration staffs in order to minimize the time spent installing and configuring the capture of data. We had full cooperation because of the sponsor/champion and much of the work was done before we got on site. Installation and configuration was completed in about 3-4 days.

In the meantime, we also spent time interviewing business units and also development and IT staffs using checklists developed prior to the visit. Also, another consulting company completed a series of interviews and asked some questions that were useful to our effort.

Normally, a capacity manager would expect to capture a “business cycle” worth of data in order to determine the peak periods and the proper modeling intervals. Absent that, the capacity manager would need to gather information about the application via interviews from the business side and would need to rely on that information.

We needed to use the data in combination with the information from the subsequent interviews – we had data for about a month – and in some cases, we had to model the annual peaks based on the data we had captured in combination with the information we got from the interviews.

Most of the time in the interview process was spent getting to know how the applications worked. These applications were very complex and many of them spanned 3-4 tiers and included the mainframe or a large data warehouse backend.

It was important to understand how the web servers, for instance, interacted with the middleware or the application servers and how workloads here affected traffic to the database servers or to the mainframe.

A sample of the type of interview questions below:

- What are the current business volumes?
- What are the predicted business volumes?
- What is the application architecture?
- Are there any predicted changes to the business, the business volumes, the architecture or anything that would change the nature of the application or the infrastructure?

This process was incredibly useful in getting enough background to make a month’s worth of data adequate (if not ideal) for us to make decision support recommendations. However, this process was not without pain, which we’ll investigate shortly...
Moving Forward

As part of the scoping exercise done prior to the start of the formal project, applications were prioritized by the Capacity Manager. This allowed me to group the applications in a meaningful way and assign them to consultants who then took on primary responsibility for completing the work.

Once the consultants received their assignments, they poured through the data and the application architecture diagrams and, as would be expected, found some gaps in the information or some clarification that needed to be made. Additional meetings were held and more information gathered.

Remote access was provided to the CDB/CMIS so the consultants could work remotely on the project and have the most recent data from the systems.

Other data was gathered from existing sources, including data from the SAN as well as network statistics and some native virtualization statistics.

Summarizing the results

The reports that came out of this process were over 100 pages in length. So we needed to:

**Break results into meaningful groups** - break the applications into meaningful groups, based on the potential pain should the infrastructure not be upgraded. These groupings allowed us to quickly summarize the results and put the appropriate amount of focus on the applications that really needed attention.

**Translate results** - technical reports need to be translated for the business units. It’s important to show the impact on applications in business terms so that the recipients of the information and recommendations from the business units understand the impact to the business.

**Summarize results** - long reports need to be summarized to something more meaningful. Yes, it’s useful to have reports that give background and show the techniques used, but the business recipients and the senior IT managers probably are looking for an executive summary. If this summary can be reduced to a sentence or two, all the better.

**Prepare CIO presentation** - a key deliverable for this project was a presentation to the CIO. Given 30 minutes on a calendar (which means about 20 minutes to present, at most), it was vital to present the information in a graphically appealing, yet informative way and communicate in business terms.

The next few slides demonstrate this.
The first slide shown to the CIO above (after a couple of introductory slides of course) consisted of some graphical ways to show that these applications were predicted to be in good shape through the 4 required prediction points provided by the business units (3 consisted of customer conversions and the fourth represented the additional work expected due to another acquisition).

As you can see, the comments try to show the potential breaking point of the application in business terms, when possible. However, these applications are not expected to have performance or capacity problems throughout the time period of this project (it could be argued that these systems/applications were over configured, but that was not part of the scope of this project) and can therefore be mentioned quickly and then “forgotten.”

These are the applications that were predicted to have potential issues in the third period (yellow face) and first two periods (red face). Some of these applications had new hardware
on order, while others needed further investigation of the applications and the components that comprised them. A few applications already were not meeting SLAs and many of those had hardware purchases pending. In some cases, those were the correct decisions and in others we determined that the bottlenecks would not be removed by adding additional hardware.

Apologies to ITIL

In most cases a process should not be tailored to a specific tool – due to the circumstances this time it was and business requirements meant at times we strayed from ITIL. We identified the tools that were in place and supplemented them with what we thought we’d need in order to complete the project.

Data should be captured for an entire business cycle - We recognized we would not be able to capture more than a month’s worth of data, requiring us to get additional information from the business units and alter our tolerance for error accordingly.

Ideally, the implementation of the process should be a long-term project but the key to any successful project is an understanding of when and where it’s necessary to vary from ITIL’s guidelines.

Quite a few challenges existed in this project, so we’ll look at those next.

Challenges

“Political factions” exist in most companies. In a Merger and Acquisition environment, they’re almost certain to exist as legacy employees and new (acquired) employees jockey for position and, potentially, their jobs.

At times, we had to ask our sponsor to find people that could provide us with some much needed data (especially historical data, where available). It’s only because of the connections and the persistence of the sponsor that we received the data we needed to be successful.

We had to be very careful in wording our observations and recommendations in such a way that neither legacy or acquired employees would be defensive or dismissive.

At times, recommendations were not well received and teams understandably felt threatened so it was crucial to be accurate as many of the “legacy” teams seemed to hope we would not succeed so the project would not continue in the same way. This issue went away when we were able to identify some likely bottlenecks that were not on the radar of any of the teams.
Summary of results

Each of the phases of the project identified some potential application bottlenecks - and opportunities for improvement for the applications. While we had to work quickly to get to the finish of the first phase of the project, once we had the report templates and the CIO presentation format in place, it provided a template to complete the second and third phase of the project.

The second and third phases of the project took considerably less time - since the architecture was well known and, essentially, the only thing required was a refresh of the data. These phases mainly consisted of applying any changes in hardware and replacing the captured data with more recent data.

Success in the first phase built credibility for subsequent phases - we spent considerably less time trying to establish and prove our credibility. There are lessons to be learned there if you are implementing a CM process of your own. Some quick wins establish traction and credibility even among the skeptics in your company.

Moving from short term to long term

The company expanded its rollout of the Capacity Management tool to include other applications. Training was provided to the staff to enable them to use the tool and complete their own studies, such as the ones covered in this engagement.

Other facets of the ITIL Capacity Management process were put in place and have led to this organization being more proactive and less reactive.

The iterative activities are an extremely important part of the successful capacity management process. Ongoing monitoring and analysis leads to tuning recommendations and continued improvement of applications and services.

Maintaining a CDB/CMIS is also important. Currently, all detailed data is being kept and the database is getting quite big. Figuring out how to summarize and aggregate and when to delete old data is an important step, especially when continuing to add targets and other objects to the CDB/CMIS.

Moving forward, there will be other opportunities to study Merger and Acquisition activity. Fortunately, those projects will be easier for this particular Capacity Management team as they will get a much earlier start on the project and have the tools and skills in place to complete the work.