



The Role of the Capacity Management Database in the ITIL Capacity Management Process

Extending the CMDB with Capacity Management Data

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Executive Summary

Within the capacity management process, the IT Infrastructure Library (ITIL)¹ recommends that you have a capacity management database (CDB). According to ITIL, the CDB is the cornerstone of a successful capacity management process as a subset of a configuration management database (CMDB). This white paper from BMC Software, Inc. demonstrates the need for capacity management and the role a CDB plays in this activity, based on ITIL goals. It defines the data types that comprise a CDB and how you would use them in managing your environment and creating a capacity plan. Capacity planning is the development, implementation, and maintenance of a plan that provides adequate computer resources to meet the performance needs of the user community. Such a plan must reflect and support the overall business plan of the company. The focus of capacity planning is to determine the most cost-effective system that can meet the actual performance requirements of the users of the system, providing neither too little nor too much capacity.

In addition, this paper will explain how capacity management and the CDB intersect and interact with other ITIL processes, as well as who else needs access to CDB data. With a well-designed capacity management process and the robust data of the CDB, managing the performance and capacity demands of your business becomes more effective.

1. ITIL is the most widely accepted approach to IT service management. ITIL provides a comprehensive, consistent, and coherent set of best practices for IT service management. The itSMF (IT Service Management Forum) was set up to support and influence the IT Service Management industry. It has been influential in promoting industry best practices and driving updates to ITIL.

What Is a Capacity Management Database?

A CDB consists of one or more databases that serve as a repository for holding multiple types of data used by all three subprocesses of capacity management. The subprocesses, as defined by ITIL, are described as follows:

- > Business capacity management focuses on current and future business requirements.
- > Service capacity management focuses on delivering existing services that support the business.
- > Resource capacity management focuses on individual technology components underpinning the entire service provision.

Each of the capacity management subprocesses generates and uses any of the types of data stored in the CDB.

Why a CDB?

Due to a growing interest in adopting best practices across IT departments, particularly according to standards such as ITIL, many organizations are now beginning to implement a CDB. The core infrastructure record, the CMDB, provides information about the state of assets and the relationships among assets. By providing performance and resource information about the configuration items (CI) of the CMDB, a CDB works in tight synergy with the CMDB to provide a complete, reliable and robust view of the business/IT infrastructure, including information about the business, service, technical, financial, and utilization data for an organization.

The importance of capacity management

A corporation doesn't just exist in real time. To survive, it must have a clear understanding of past trends and performance, current service delivery, future business requirements, and the IT infrastructure supporting it all. The role of capacity management is to ensure that current and future capacity, and performance aspects of the business requirements, are provided in a cost-effective manner.

For example, if you run the credit card services division of a large bank, you may be faced with the challenge of planning for the capacity required to support the coming year's business volumes. To do this effectively, you will need the following information:

- > The business's forecast for transaction volumes
- > Data regarding the resource requirements for processing those transactions
- > Financial information regarding the cost of hardware and software alternatives

All of this information should be combined in a single logical location: the CDB. These three sources of data independently give only a partial picture of the costs and revenue per transaction. However, tied together in a CDB, a capacity manager can report the full financial picture of this business service.

Goals

Capacity management is concerned with having the appropriate IT capacity and making the best use of it. To this end, capacity management should ensure

- > Reduced risk – the ability to identify whether there are sufficient resources for a new application before it goes live or to accomplish changes in application demand
- > Increased efficiency – better use of existing and future resources instead of providing additional resources every time there is a performance problem
- > Confident forecasts – more accurate forecasts for future resource requirements, which will lead to improved financial estimating
- > Cost effectiveness – defer expensive hardware upgrades through effective planning and ensure that excessive over-capacity does not exist in an ongoing fashion

Benefits

Achieving these goals benefits your organization in significant, measurable ways by ensuring that IT capacity always exists and that it is closely matched to the current and future identified needs of your business. The benefits extend beyond capacity management into other processes and provide decision support to many areas. [“The Value of the CDB to Other ITIL Processes” on Page 7.](#)

Decision support

Your IT managers benefit from having accurate capacity information mapped to business processes. Making decisions is easier when you have complete and accurate data, resulting in better resource and performance estimates. You can commit to service levels with confidence and your risk management will improve, reducing unplanned downtime. The CDB also can be a resource in making key decisions such as when to plan downtime, thus minimizing the business impact of these decisions.

Data is key

You can choose to begin your capacity management efforts with a variety of tools, from raw performance data analysis to the use of purpose-built tools. But the core of the process is having a robust and complete store of performance data that maps historical resource usage to both business services and to infrastructure capacity. Organizations that have a CMDB in place already benefit from mapping

the configuration items (CIs) in the CMDB to the time-series performance data in a CDB. This data must be complete, which means it must be collected continually. Collection must be automated, to avoid inaccuracies due to manual intervention and for scalability. This data also should be available to all of your other IT processes, because even the most accurate data is useless if you cannot access it.

The solution that lets you maintain accurate capacity data that is shared by multiple IT processes is a CDB, a subset of the CMDB.

Integrated data stores

In some cases, vendors have offered a single repository for all systems data. For smaller IT environments, this may be feasible, but in the case of larger ones, the data collected is likely to be so voluminous (for example, multi-terabyte) that a single data store cannot perform well and will be too large. In these situations, all requests would feed into the same database, potentially causing I/O delays, delays in population, as well as in backup and recovery.

A more workable solution is to have common access to functionally integrated data stores, rather than to a single mega-database. The end user or process does not need to know how or where the data is stored; the common access capability hides the details and the CDB appears as a single virtual database, without the drawbacks that a single physical store would present.

When properly designed, the CDB becomes a subset of a federated CMDB, with common access to CIs that permits access to the data from all interested consumers. The following figure illustrates the relationship of the CDB to the CMDB and other elements of ITIL.

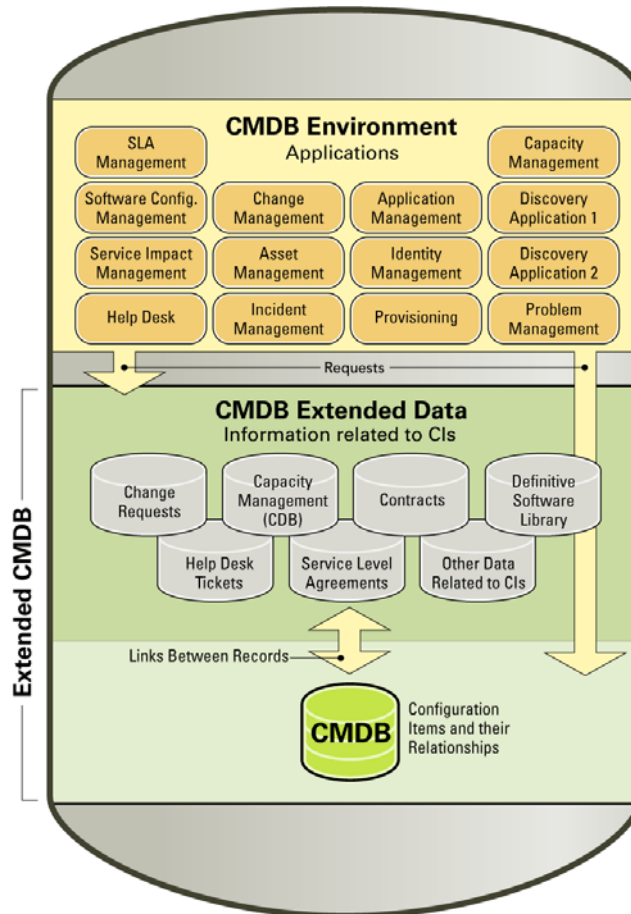


Figure 1: Relationship between the CMDB and the CDB

Recommended CDB Approaches

BMC believes that a CDB should be an integral part of a federated data model that features a comprehensive CMDB. The CMDB also should be linked to other data stores. This is the best way to share capacity management data without the high setup and maintenance costs associated with the centralized approach. This section describes the types of data involved and then explains how the pieces fit together.

The contents of an ITIL CDB

ITIL recommends that you store several types of data in the CDB. These components are needed to complete the capacity management process. See the following table.

Data type	Description
Business data	Includes the number of users of an application, the number of PCs, the number of accounts and products supported, or the number of Web site business transactions executed.
Service data	Represents the effect the IT infrastructure has on the work of the end user. As such, this would include batch turnaround times or online response times. It is useful to include performance threshold data with service data, to represent the SLAs that service level management and capacity management have agreed to.
Technical data	Represents the component limits in the infrastructure. Helps determine, for each entity, the point where over utilization degrades performance of business services. ITIL limits technical data to this construct, but acknowledges that actual thresholds depend on the kind of work being executed. For example, a server may be limited to running at only 40 percent utilized due to I/O constraints. Ideally, the component limits are sensitive to the work being executed.
Financial data	Includes a variety of information regarding cost. Some of the items in the following list are not part of the CDB but instead link to sources where the financial data that is to be stored in the CDB can be obtained. <ul style="list-style-type: none"> > financial costs of upgrades > the cost of maintaining the current hardware > the revenue gained by the organization processing a transaction > the costs associated with processing a transaction Often, a valuable use of the data in the CDB is to develop the chargeback costs – what the IT organization charges for services provided. This enables the business to weigh revenue against the cost of doing business.
Utilization data	Reports utilization numbers, including current and historical values. Part of the management of the CDB includes automation of data collection, summarization, and archiving. Though many options exist, an ideal option is one where system metrics map directly to business workloads and applications, thus expanding the value of the data beyond the IT organization.

The outputs from a CDB

The primary goal of a CDB is to provide the relevant capacity and performance data to the sub-processes of capacity management. “[The Value of the CDB to Other ITIL Processes](#)” on [Page 7](#) for a description of how other ITIL processes interested in this data will be surveyed. The Information stored in the CDB is delivered to management and technical personnel in the form of performance and capacity reports, including:

- > *Service and Component-based reports*—These reports reflect unused and used capacity and service performance.
- > *Exception reports*—These reports are a logical extension of the service and component-based reports, but focus on problems. Using statistical methods and historical data, exception reports identify when a component or business service deviates from expected performance. Automated exception reporting also minimizes the time required to analyze and solve the problem.

- > *Capacity forecasts*—These reports show the impact of future business demands on the IT infrastructure and its performance. These forecasts are input to the regular capacity plan that governs the IT department's investments, to maintain and assure performance and capacity in the service of the business.

These reports in the CDB provide not only current service, exception, and capacity information, they also help IT managers forecast and plan for future capacity.

The Value of the CDB to Other ITIL Processes

Though the CDB is owned and maintained by the capacity manager, the available data is useful to other ITIL processes.

- > Availability management must be able to determine the causes of unacceptably slow performance. Unacceptably slow performance for a business service can have almost the same impact as if the service were unavailable. As such, availability management needs to understand and use the data reported on performance degradation.
- > Configuration management requires a CMDB. Since the CDB is a subset of a CMDB, the data in the CDB stores resource and capacity usage information about configuration items in the CMDB. This linkage is key since information provided by capacity management is shared with other processes via the CMDB.
- > Change management needs capacity information to assess the "before and after" impact of changes on capacity. The CDB provides a "before" picture for any configuration changes or upgrades. Prior to making actual changes, the CDB is a reference source for determining the effects of these proposed changes. Once changes are made, the CDB also assists with monitoring results after the configuration change, to ensure it had the desired effect.
- > Release management needs to plan and oversee hardware and software rollouts. Accessing data in the CDB prior to a rollout can help ascertain whether there is adequate capacity for a successful rollout. On an ongoing basis, the CDB helps determine the distribution strategy, and the CDB data used in the post-distribution audit helps ensure the rollout was successful from a capacity standpoint.
- > Service level management benefits from a reliable source of performance data that can be used to set reasonable goals and to measure the achievement of those goals in production. The capacity manager works closely with the service level manager to define the SLAs. For all performance-related SLAs, the CDB becomes the database of record, tracking compliance with the agreements.
- > Incident management needs to monitor data stored in the CDB to generate incidents when exceptions are noted. Incident management and capacity management are reciprocally related in that incident management tells capacity management about incidents related to capacity and performance, while capacity management resolves and documents capacity related incidents.
- > Problem management needs the ability to review utilization and service data to quickly identify the root cause of performance problems. This data is needed both on a real-time and historical basis to see the current situation and the history building up to the event. The CDB is a key source of this data.
- > Financial management needs to understand the chargeback algorithms, as well as the requirement to budget for additional hardware or software. The CDB maintains the resource usage data for total system and per-business service usage to generate costing and/or chargeback reports for end-user departments that are charged for their systems usage. Additionally, financial management often maintains the financial data within the CDB to provide based on the IT budget and financial plans.
- > IT service continuity management utilizes the output of modeling, which can be found in the CDB. This output can be valuable when the capacity manager models the impact of various failures, disaster recovery, or business demand change scenarios. Too often, the capacity of the failover configuration has not been assessed, leading to invalid configurations, and potentially costly impacts on the business.

Conclusion

The CDB is critical to successfully implementing the capacity management process. It contains a variety of data essential to the various subprocesses of capacity management.

This information is crucial for managing ongoing performance, solving problems, and managing future business needs without interruption or degradation. A key factor is having the right tools capable of automating the process of data collection, summarization, and most importantly, workload characterization, to ensure mapping of systems variables to business services.

The CDB represents the source of all data needed to accurately report on historical capacity usage and produce the capacity plan, which is critical to accurate business and financial forecasting. Accurate design and management of the CDB results in a more optimal IT environment, where proactive planning and management is the rule of the day, and reactive management is the exception.

BMC offers the BMC[®] Performance Assurance[®] Suite for Servers product line centered around the CDB. To learn how these products can help you reach your configuration management goals, contact your BMC sales representative or visit www.bmc.com and learn about the BMC Performance Assurance product suite.

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