Integrating Systems Management Disciplines

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Introduction – At this point we have thoroughly discussed the 12 disciplines of systems management and how to use technology to develop in a robust manner the processes that comprise and support them. Now we will look more closely at the various relationships between these 12 disciplines with the intent of learning which of these integrate best with each other. We will find that understanding to what degree a given discipline is tactical or strategic in nature can help understand the integrating relationships between them.

Distinguishing Strategic From Tactical Disciplines

Most IT professionals seem capable of distinguishing between strategic tactical activities. But in my experience infrastructure personnel cannot always apply these differences to system management disciplines. Table 22-1 lists some of the key differences between strategic and tactical disciplines of systems management.

Table 22-1 Differences Between Strategic and Tactical Disciplines

Strategic	Tactical
1. Long range in nature	1. Short range in nature
2. Two to three year focus	2. Day-to-day focus
3. Supports long term business goals	3. Supports short term service level agreements
4. May require months to see results	4. Should see results within a a few days or weeks
5. May require additional budget approvals to implement	5. Should already be in the existing budget

The reason it is important to understand which systems management disciplines are strategic and which are tactical is that each of these disciplines integrate with, and depend on, other disciplines for optimal use. For example, production acceptance, change management and problem management all interact with each other when implemented properly. Knowing which of these three key processes is tactical versus strategic helps to better understand their relationship to each other. Two processes that are both tactical will interact differently then two which are strategic, and each of these pairs will interact differently from a pair that is a mixture of strategic and tactical. Knowledge of a discipline's orientation can also assist in selecting process owners who are more aligned to the strategic or tactical nature of the process for which they are responsible.

Identifying Strategic Disciplines

Each of the 12 systems management disciplines have been described with formal definitions in previous chapters. Examining these definitions and combining this analysis with the properties of strategic disciplines in the prior section results in five of these processes being designated as strategic. Table 22-2 lists these five strategic disciplines.

Table 22-2 Strategic Disciplines of System Management

1. Production Acceptance
2. Capacity Planning
3. Security
4. Disaster Recovery
5. Facilities Management

While all of these strategic disciplines have tactical aspects associated with them, the significant value of each one lies more in their strategic attributes. For example, the tactical part of production acceptance, capacity planning and disaster recovery involves the important activities of deploying production software, installing hardware upgrades and restoring business operations, respectively. But analysts responsible for these critical events could not execute them successfully without a strategic focus involving thorough planning and preparation.

Similarly, security and facilities management tactically monitor the logical and physical environments for unauthorized access or disturbance on a continual basis. But the overriding objective of ensuring the ongoing integrity and use of the logical and physical environments requires significant strategic thinking to plan, enforce and execute the necessary policies and procedures.

Identifying Tactical Disciplines

We now turn our attention from strategic disciplines to tactical ones. Employing a method similar to what we used in the strategic area, we identify seven disciplines as being tactical in nature. Table 22-3 lists these seven processes. Just as the strategic disciplines contained tactical elements, so also do some of the tactical disciplines contain strategic elements. For example, the network and storage management disciplines involve not only the installation of network and storage equipment, but the planning, ordering and scheduling of such hardware as well. These latter activities require months of advance preparation. But the majority of activities associated with these two processes are tactical in nature, involving real-time monitoring of network and storage resources to ensure they are available and in sufficient quantity.

Table 22-3 Tactical Disciplines of Systems Management

1. Availability
2. Performance and Tuning
3. Change Management
4. Problem Management
5. Storage Management
6. Network Management
7. Configuration Management

The Value of Distinguishing Strategic from Tactical Disciplines

There are four reasons to distinguish systems management disciplines as being either strategic or tactical in nature. These are summarized in Table 22-4. First, some analysts by their nature are more strategically oriented while others are tactically oriented. Understanding which disciplines are strategically or tactically oriented can facilitate a more suitable match when selecting a process owner for a particular discipline.

Second, the degree of emphasis or support which an infrastructure places on specific disciplines can indicate an organization's orientation toward systems management processes. An infrastructure that focuses mostly on tactical disciplines tends to be more reactive in nature while those focusing on strategic disciplines tend to be more proactive in nature.

Third, infrastructure managers typically want to assess the quality and effectiveness of the 12 disciplines within their organization to determine which ones need the most refinement. Knowing the orientation of the disciplines requiring the most improvements indicate whether the necessary improvements are tactical or strategic in nature.

Finally, in a world-class infrastructure each of the systems management disciplines integrate with one or more other ones for optimal effectiveness. Understanding which disciplines are tactical or strategic in nature assists in addressing integration issues.

Table 22-4 Reasons To Distinguish Strategic From Tactical Disciplines

1. Facilitates the selection of process owners
2. Indicates an infrastructure's orientation
3. Quantifies orientation of improvement needs
4. Optimizes the integration of disciplines

Relationships Between Strategic and Tactical Disciplines

As mentioned earlier, each of the 12 systems management disciplines integrate with, and depend on, other disciplines for optimal use. We are about to see that, in fact, all of them interact with at least one of the other disciplines. Several interact with more than half of the remaining total. Some disciplines have no significant interaction, or relationship, with a specific other one. So how do we know which disciplines form what type of relationships with which others?

Figure 22-1 provides us these answers. Each of the 12 disciplines is listed along the top and left hand side of the matrix and is designated as either tactical or strategic. If the combination of two tactical disciplines results in a significant process relationship, then the interaction of the two is designated as T for Tactical. If the combination of two strategic disciplines results in a significant process relationship, then the interaction of the two is designated as S for Strategic. If a significant relationship is the result of the combination of a tactical and strategic discipline, then the interaction is designated as M for Mixture. If the combination of any two disciplines, either tactical or strategic, results in no significant interaction then the intersecting box is left blank.

	(T) **AV**	(T) **PT**	(S) **PA**	(T) **CM**	(T) **PM**	(T) **SM**	(T) **NM**	(T) **CF**	(S) **CP**	(S) **SE**	(S) **DR**	(S) **FM**
(T)**AV**				T_1	T_2		T_3					
(T)**PT**					T_4	T_5	T_6		M_7			
(S)**PA**				M_8	M_9				S_{10}	S_{11}		
(T)**CM**	T_1		M_8		T_{12}	T_{13}	T_{14}	T_{15}	M_{16}	M_{17}		
(T)**PM**	T_2	T_4	M_9	T_{12}			T_{18}					
(T)**SM**		T_5		T_{13}					M_{19}		M_{20}	
(T)**NM**	T_3	T_6		T_{14}	T_{18}				M_{21}	M_{22}		
(T)**CF**				T_{15}								
(S)**CP**		M_7	S_{10}	M_{16}		M_{19}	M_{21}					S_{23}
(S)**SE**			S_{11}	M_{17}			M_{22}					
(S)**DR**						M_{20}						S_{24}
(S)**FM**									S_{23}		S_{24}	

Figure 22-1 Relationships of Strategic and Tactical Disciplines

Legend

AV – Availability Management **PM –** Problem Management **CP –** Capacity Planning

PT - Performance and Tuning **SM -** Storage Management **SE -** Security

PA – Production Acceptance **NM –** Network Management **DR –** Disaster Recovery

CM – Change Management **CF –** Configuration Management **FM –** Facilities Management

T - Both disciplines in the relationship are Tactical (T) – Discipline is Tactical in nature

S – Both disciplines in the relationship are Strategic (S) - Discipline is Strategic in nature

M- The relationship is a Mixture of tactical and strategic disciplines Subscripts refer to the explanations of relationships beginning on page 262.

The matrix in Figure 22-1 supplies several pieces of valuable information. It represents which disciplines are designated as tactical and which are strategic. It shows for each discipline which other ones with which it interacts, and whether that interaction is entirely tactical, strategic or a mixture of the two. Finally, the matrix quantifies which disciplines interact the most and the least with each other. Managers of well-run infrastructures understand and utilize these these relationships. Knowledge of these interactions leads to better managed infrastructures. We will examine the generic issues of integrating disciplines that are solely tactical, solely strategic and a mixture of the two. Following that we will discuss at more length each of the 20 integrated relationships.

Issues of Integrating Solely Tactical Disciplines

Referring to Figure 22-1 we see there are ten relationships involving solely tactical disciplines. We list these ten relationships in Table 22-5. One of the issues of integrating solely

Table 22-5 Relationships of Solely Tactical Disciplines

1. Availability - Change Management
2. Availability – Problem Management
3. Availability – Network Management
4. Performance and Tuning – Problem Management
5. Performance and Tuning – Storage Management
6. Performance and Tuning – Network Management
7. Change Management – Problem Management
8. Change Management – Storage Management
9. Change Management – Network Management
10. Change Management – Configuration Management
11. Problem Management – Network Management

tactical disciplines is the tendency to emphasize only short term goals and objectives. Tactical disciplines by their nature have very limited planning horizons, sometimes forcing

an hour-to-hour focus of activities. If left unchecked this tendency could undermine efforts at long range, strategic planning.

Another issue with purely tactical disciplines is that most of these now involve 24x7 coverage. The emphasis on around-the-clock operation can often infuse a reactive, firefighting type of mentality rather than a more proactive approach. A third issue which follows from the previous focus on reactive, continuous operation is the threat of burnout. Shops which devote most all of their systems management efforts on tactical disciplines run the risk of losing their most precious resources, human talent.

Issues of Integrating Solely Strategic Disciplines

There are four relationships based solely on strategic disciplines and these are listed in Table 22-6. One of the issues with strategic relationships is that a continuing emphasis on long range planning sometimes results in nothing ever getting implemented. Thorough planning needs to be followed with effective execution. Another issue that more directly involves the staff is that most infrastructure analysts are more tactical than strategic in there outlooks, actions and attitudes. These relationships must be managed by individuals with a competent, strategic focus. A final

Table 22-6 Relationships of Solely Strategic Disciplines

1. Production Acceptance – Capacity Planning
2. Production Acceptance – Security
3. Capacity Planning – Facilities Maangement
4. Disaster Recovery – Facilities Management

issue with strategic relationships is that budgets for strategic resources, be they software, hardware or human, often get diverted for more urgent needs.

Issues of Integrating Tactical and Strategic Disciplines

Referring again to Figure 22-1 we see there are nine relationships formed by a combination of tactical and strategic disciplines. These nine are listed in Table 22-7. The first, and likely most obvious, issue is the mixing of tactical and strategic disciplines whose orientations may appear at odds with each other. Conventional thinking would conclude that short-range tactical actions do not mix well with long-range strategic plans. But common goals of reliable, responsive systems, excellent customer service, and accomplishing business objectives can help to reconcile these apparent discrepancies.

Another issue with integrating these two dissimilar types of disciplines is that it throws together process owners whose orientation between short and long range focus may conflict. Again, the emphasis of common goals such as what was discussed above can help to alleviate these divergent views.

A final issue involving relationships of mixed disciplines is the need to recognize which elements are truly tactical and which are truly strategic. For example, the combination of tactical change management and strategic capacity management is a mixed discipline relationship. But some changes may require weeks of advanced planning, resulting in a strategic focus on a normally tactical discipline. Similarly, the last step of a major capacity upgrade is the installation of the hardware which is a tactical activity associated with a normally strategic discipline. Knowing and understanding these differences can help to better facilitate the relationships of mixed disciplines.

Table 22-7 Relationships of Tactical and Strategic Disciplines

1. Performance and Tuning – Capacity Planning
2. Production Acceptance – Change Management
3. Production Acceptance – Problem Management
4. Change Management – Capacity Management
5. Change Management – Security
6. Storage Management – Capacity Management
7. Storage Management – Disaster Recovery
8. Network Management - Security
9. Network Management – Capacity Management

Examining the Integrated Relationships of Strategic and Tactical Disciplines

The previous sections discussed generic issues associated with integrating disciplines. Here will look at each of the 24 relationships in greater detail. They will be presented in the order displayed by the subscripts in Figure 22-1.

1. AV/CM(T) – Availability and change management are tactical disciplines. The relationship here centers mostly on scheduled outages which should be handled as scheduled changes. Unscheduled outages should be treated as problems.

2. AV/PM(T) – Both availability and problem management are tactical disciplines and involve handling outages and problems on a real-time basis. Any incident that impacts continuous availability is referred to as an outages, and is usually handled as a problem. Just as problems can be categorized as to severity, urgency, priority and impact, outages can also be so categorized. Scheduled outages that result in longer than planned downtimes may be logged as a

problem but in all likelihood at a lower priority than an unscheduled outage. Similarly, outages occurring during primetime are no doubt more severe than those occurring during the off-shifts.

3. AV/NM(T) – Networks now play a crucial role in ensuring online availability. Outages of entire networks are rare these days due to highly reliable network components and redundant configurations. When network outages do occur the availability of several systems are usually impacted due to the integrated nature of today's systems.

4. PT/PM(T) – Performance and tuning, and problem management, are very closely related often being thought of as the same issue. But there are important differences. Slow online response times, long running jobs, excessive loading times and ever increasing tape backup times are performance problems since they directly affect end-user services. As such they should be treated as problems and handled through the problem management process. But just as not all problems should not be considered as performance issues, not all performance issues should be considered as problems. The ongoing maintenance of indices, directories, extents, page space, swap areas, the number and size of buffers, amount of local memory and the allocation of cache storage are normally regarded as sound, preventative performance/tuning activities rather than problems. When done in a timely and proper manner they should prevent problems as opposed to causing them.

5. PT/SM(T) – Lack of sufficient storage space, including main memory, virtual storage, cache buffering, raw physical disk storage or logical storage groups, can often result in poor online or batch performance.

6. PT/NM(T) – The configuration of various network devices such as routers, repeaters, hubs and network servers can affect online performance, just as various software parameters such as network retries, line speeds and the number and size of buffers can alter transaction response times.

7. PT/CP(M) – This is our first relationship that mixes a tactical discipline in the form of performance and tuning with that of a strategic one, namely capacity planning. Poor performance and slow response times can certainly be attributed to lack of adequate capacity planning. If insufficient resources are available due to larger than expected workload growth, or a greater number of total or concurrent users, then poor performance will no doubt result.

8. PA/CM(M) – This relationship is another mixture of tactical and strategic disciplines. New applications and major upgrades to existing applications should be brought to the attention of, and discussed at, a change review board. But the board should understand that for these types of implementations a far more comprehensive production acceptance process is needed than just the change management process.

9. PA/PM(M) – This relationship between strategic production acceptance and tactical problem management occurs whenever a new application is being proposed, or a major upgrade to an existing application is being planned. In this case I will use the terms problem management and level 1 help desk staff synonymously.

   As soon as the new system or upgrade is approved, the various infrastructure support groups, including level 1 help desk personnel, become involved. By the time deployment day arrives the help desk staff should have already been trained on the new application and be able to anticipate the types of calls from users.

   During the first week or two of deployment level 2 support personnel for the application should be on the help desk to assist with call resolution, to aid in cross-training level 1 staff, and to analyze call activity. The analysis should include call volume trends and what types of calls are coming in from what types of users.

10. PA/CP(S) – This is the first of three systems management relationships in which both disciplines are strategic. New applications or major upgrades to existing applications need to go through a capacity planning process to ensure adequate resources are in place prior to deployment. These resources include servers, processors, memory, channels, disk storage, tape drives and cartridges, network bandwidth and various facilitation items such as floor space, air conditioning and conditioned and redundant electrical power. Commercial ERP systems such as SAP, Oracle or PeopleSoft may require upgrades to the hosting operating system or database.

    The capacity planning for a new application may also determine that additional resources are needed for the desktop environment. These may include increased processing power, extensions to memory or special features such as fonts, scripts or color capability. One of my clients implemented SAP for global use and required variations of language and currency for international use.

11. PA/SE(S) – This is another all strategic relationship. New applications should have clearly defined security policies in place prior to deployment. An application security administrator should be identified and authorized to manage such activities as password expirations and resets, new user authorization, retiring userids, and training of the help desk staff.

12. CM/PM(T) – The next six relationships all involve change management. Change management and problem management are directly related to each other in the sense that some changes result in problems, and some problems, in attempting resolution, result in changes. The number of changes that eventually cause problems, and the number of problems that eventually cause changes are two good metrics to consider using. The collection and analysis of these metrics can be more readily facilitated by implementing the same online database tool to log and track both problems and changes.

13. CM/SM(T) – Changes to the type, size or configuration of disk storage, tape libraries, main memory or cache buffering should all go through an infrastructure's change management process.

14. CM/NM(T) – Changing hubs, routers, switches, components within these devices, or the amounts or allocations of bandwidth should be coordinated through a centralized change management process. Some shops have a separate change management process just for network modifications but this is not recommended.

15. CM/CF(T) – Any changes to hardware or software configurations should be administered through both the change management process to implement the change, and through the configuration management process to document and maintain it. The types of configuration changes that apply here include application software, system software and hardware, network software and hardware, microcode and physical and logical diagrams of network, data center and facilities hardware.

16. CM/CP(M) – The strategic side of this relationship involves long range capacity planning. Once the type and size and implementation date of a particular resource is identified, it can than be passed over to the more tactical change management process to be scheduled, communicated and coordinated.

17. CM/SE(M) – This relationship again mixes the tactical with the strategic. The strategic portion of security involves corporate security policies and enforcement. Changes such as security settings on firewalls, new policies on the use of passwords, or upgrades to virus software should all through the change management process.

18. PM/NM(T) – The reactive part of network management that impacts individual users is directly tied to problem management. The same set of tools, databases and call-in numbers used by the help desk for problem management should be used for network problems.

19. SM/CP(M) – Capacity planning is sometimes thought of only in terms of servers, processors or network bandwidth. But most any capacity plan needs to factor in storage in all its various forms, including main memory, cache, disk arrays, server disks, tape drives and cartridges, and even desktop and workstation storage.

20. SM/DR(M) – One of the key aspects of disaster recovery is the ability to restore valid copies of critical data from backup tapes. One of the key responsibilities of storage management is to ensure that restorable copies of critical data are available in the event of a disaster, so there is an obvious relationship between these two disciplines.

21. NM/CP(M) – Just as network management should not have a separate change management process, it also should not have a separate capacity planning process

for network resources such as hubs routers, switches, repeaters and especially bandwidth. This relationship is often overlooked in shops where the network has grown or changed at a much different rate from that of the data center.

22. NM/SE(M) – The expanding connectivity of companies world-wide and the proliferation of the Internet exposes many networks to the risk of unauthorized access to corporate assets, and to the intentional or inadvertent altering of corporate data. Managing network security creates a natural relationship between these two disciplines.

23. CP/FM(S) – An element of capacity planning sometimes overlooked is the affect that upgraded equipment will have on the physical facilities of a data center. More than once a new piece of equipment has arrived in a computer room only to find there were no circuits, or plugs or outlets with the proper adapters on which to connect it. Robust capacity planning processes will always include facilities management as part of its requirements.

24. DR/FM(S) – This is the final all strategic relationship. Statistics indicate that most IT disasters are confined or localized to a small portion of the data center. As a result, proper facilities management can often prevent potential disasters. A comprehensive, disaster recovery plan that includes periodic testing and dry-runs can often uncover shortcomings in facilities management that can be corrected to prevent potential future disasters.

Significance of Systems Management Discipline Relationships

As mentioned earlier, Figure 22-1 displays a wealth of information about the relationships of systems management disciplines. One final area worth discussing is which disciplines have the greatest number of relationships with others, and what is the significance of such information.

Table 22-8 is a sorted list of the number of relationships associated with each discipline. This list also represents the relative importance of individual system management functions. We see that change management has the highest number with eight. This should not be surprising. In today's complex infrastructure environments, the quality and robustness of change management has a direct effect on the stability and responsiveness of IT services offered.

This tells us that one of the first places to look to improve an IT infrastructure is its change management function. Developing it into a more robust process will also likely improve several of the other processes with which it frequently interacts. Speaking of the frequency of interactions, I have not included the relationships of change management to performance and tuning, disaster recovery or facilities management due to the low frequency of major changes that occur in these areas.

Problem management is next on the list with five relationships to other disciplines. This should come as no surprise as we have often stated the close relationship between problem and change management. In fact, each of the five disciplines that relate to problem management also relates to change management. What may be a bit surprising is that capacity planning is also listed as having five relationships. Many shops underestimate the importance of sound capacity planning and do not realize that to do it properly requires the interaction with these other five disciplines.

Next is production acceptance with four relationships to other disciplines. Following this is the trio of performance and tuning, network management and storage management, each of which has three relationships to other processes. Next comes availability and security with two relationships each, followed by configuration management, disaster recovery and facilities management with one relationship each.

Table 22-8 Number of Associated Relationships by Discipline

	Discipline	Number of Relationships	Related Disciplines
1.	Change Management	8	Availability; Performance/Tuning; Production Acceptance; Configuration Management; Capacity Planning; Network Management; Storage Management; Security
2.	Network Management	6	Availability; Performance and Tuning; Problem Management; Change Management; Capacity Planning; Security
3.	Capacity Planning	6	Performance/Tuning; Change Management; Production Acceptance; Network Management; Storage Management; Facilities Management
4.	Problem Management	5	Availability; Performance/Tuning; Change Management; Production Acceptance; Network Management
5.	Production Acceptance	4	Problem Management; Change Management; Capacity Planning; Security
6.	Storage Management	4	Performance/Tuning; Change Management; Capacity Planning; Disaster Recovery
7.	Performance/Tuning	3	Problem Management; Capacity Planning; Storage Management
8.	Availability	2	Problem Management; Change Management
9.	Security	2	Change Management; Production Acceptance
10.	Disaster Recovery	2	Storage Management; Facilities Management
11.	Facilities Management	2	Capacity Planning; Disaster Recovery
12.	Configuration Management	1	Change Management

The significance of these relationships is that they point out the relative degree of integration required to properly implement these processes. Shops that implement a highly integrated discipline like change management in a very segregated manner usually fail in their attempt to have a robust change process. While each discipline is important in its own right,

the list in Table 22-8 is a good guideline of which disciplines to look at first in assessing the overall quality of an infrastructure.