

Predictive Quantitative Collaboration Model

A white paper on critical success factors for multi-vendor global IV&V engagements

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Abstract

Large IV&V engagements, dedicated testing centers, testing centers of excellences and strategic testing centers have become a common theme for large deals in IV&V service offerings. In such IV&V/QA global engagements, the IV&V team must interact with multiple vendors in the AM/AD infrastructure space, along with the client user, program management and test management teams. Collaboration across vendors is the biggest critical success factor for the complete engagement. If we could quantify collaboration and define a model to achieve higher collaboration with visibility across vendors, the results would be phenomenal. This paper is an attempt to showcase the need for collaboration. It highlights a predictive quantitative collaboration model. The predictability is derived from an empowered Test Management Office (TMO) and risk mitigation from the client side. An indicative TMO is also at length.

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Introduction

In the last decade, companies looked to the traditional, single vendor outsourcing model to help them focus on their core competencies and keep their systems up and running. They anticipated that the outsourcing model would reduce their operational and capital expenses, give them a greater opportunity to keep their systems up-to-date, and free up their internal IT staff to focus on strategy and keeping clients happy.

This decade has witnessed the multi-vendor approach where organizations have multiple external IT service providers to reduce service costs, gain flexibility and access specialized skills that support business objectives. This approach enables firms to obtain best-in-class services and avoid the trouble of finding a single IT service provider to meet all their requirements. This occurs frequently in the IV&V service offering area. Testing Centers of Excellence (TCoEs), Dedicated Testing Centers (DTCs) and similar setups are on the rise. With the advent of large sized deals in the IV&V arena, the single most critical success factor is setting up a collaborative environment. It is not easy to set up a collaborative model first and then to measure it, because in principle, collaboration is a behavioural aspect. The paper makes an attempt to answer the following questions.

- Can there really be a model to effectively measure collaboration?
- Is there a way to quantify collaboration?
- Is there a way to measure it such that the overall predictability of the collaboration can be determined?

In the following sections, the implications of multi-vendor environment are discussed, followed by typical multi-vendor setup and key challenges, including collaboration. The sections after that discuss collaboration in detail, including a working predictive quantitative model for collaboration. The key concepts are derived from experiences gained while executing similar engagements.

Implications of a Multi-Vendor Environment

The following implications must be considered for a multi-vendor environment:

- Complexity of the IT environment increases exponentially as multi-vendor environments introduce complex interactions between vendors
- Integration becomes complex because vendors have to cooperate to integrate their disparate systems
- Problem resolution becomes difficult because it is hard to determine the point of failure and the responsible vendor. This can result in vendors blaming each other.
- Duplication occurs because vendors have certain functions in common, such as reporting and help desks
- Management of contracts becomes more labour-intensive due to the complexity of the vendor landscape. Greater contract management resources are required in multi-vendor environments
- Risk increases because the organization's IT environment is completely dependent on all vendors providing seamless service delivery and integration
- Cost of IT may be higher than in a single-sourced environment. While the costs of individual IT segments may seem lower on the surface, the cost of integrating systems and managing the contracts may result in the organization actually increasing its IT spending.

All the above implications are detrimental to the success of any engagement. The success for an independent testing center is more at risk because of the traditional divide between the development and testing worlds. A separate vendor looking at the testing space, without enough support from all levels can create challenges. The basic idea of independent, unbiased testing can lead to huge differences and ultimately cause heart burns, project delays and failures in delivering key benefits for the client.

IV&V in a Multi-Vendor Environment

Exhibit 1 illustrates a typical multi-vendor IV&V setup with the steering committee sitting on top. In this setup a central steering committee or governance structure, which monitors the program, is absolutely necessary. The members of this steering committee should be ideally from within the firm, rather than a systems integrator.

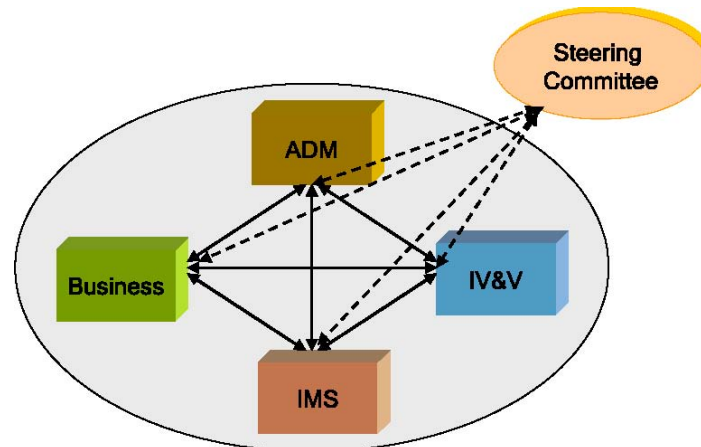


Exhibit 1: Steering committee should monitor a multi-vendor program

Critical Issues in Setting Up Multi-Vendor Teams

Scoping the services – Vendor sandbox

The definition of services is especially important in a multi-vendor contract, so that each supplier knows the respective bounds of responsibility vis-à-vis the other suppliers. The customer is assured that nothing has been missed and no services are falling ‘through the gaps’.

This comprehensive, detailed approach requires more discipline than conventional outsourcing arrangements. In the latter, because of broad-brush obligations, it is common for the supplier to take responsibility for all tasks that the in-house department performed prior to transfer of responsibility. This kind of responsibility is unlikely to work in a multi-sourcing arrangement, because a supplier will be less inclined to accept a sweep-up responsibility that may encroach upon another supplier’s scope of services and increase its overall responsibility. Similarly, the customer should seek to avoid interference with the other suppliers’ scopes and limit scope creep, both of which can cause relationship issues and finger-pointing. This can be achieved by meticulous clarity in definition of various service scopes.

Once sandbox for all teams is defined (who is responsible for what). Inputs/output for each team needs to be defined and published as part of the project plan. IV&V partners can QA the work products, which move between sandboxes of vendors before they are signed off. The entry/exit criteria for all phases will have to be defined. IV&V partner can play a critical role here. Ideally, IV&V partner should be a sign off party to all external deliverables coming out

of other teams viz AMD, IMS, and Business etc. To essay a QA role comprehensively, a collaboration model has to be in place.

Scope change

Change of scope in a multi-vendor set-up is a major challenge. All such changes should go through a change control board, which should ideally have representation from all teams/vendors. The purpose is to make sure that there is transparency in changes and change impact analysis is carried out in controlled manner. It is the responsibility of the steering committee to make sure that these processes are defined and made known right at the inception stage. Also, there should be a general framework defined in the agreements signed while defining scope/sandbox of the services. This collaboration helps the steering committee to have better. For instance, normally a change agreed by Business would be communicated to the ADM supplier, but not to the IV&V partner. This results in faulty defect identification, waste of effort/money and thus a de-motivated testing team. A collaborative environment is healthier and helps in achieving a shared goal.

Need for collaboration between teams

Giving various packages of services to different suppliers increases the difficulty of achieving an end-to-end service. However, there are a number of steps that a customer can take to mitigate this problem.

Suppliers will need to work together i.e. collaborate to varying degrees throughout the duration of their respective agreements. Accordingly, it will be important to include in the agreements, obligations to co-operate with other suppliers, preferably at no additional cost to the customer. It is possible that the co-operation required will include the exchange of confidential information and they may, understandably, resist such disclosures to their competitors. However, the customer should take the view that the service it needs to receive outweighs these concerns. One effective way to handle this problem would be to get suppliers to execute direct confidentiality agreements between themselves. This may give them additional comfort and perhaps limit disclosures and the purposes to which they can be put.

OLA and collaboration

There is potential for suppliers to blame one another, as well as the customer, for failure to achieve service levels. To avoid this, service levels, more than ever, need to be structured and measured in a way that allows for transparent and objective measurement of the supplier's achievement against them. Not only is this an issue in relation to the service levels themselves, but the reporting and governance obligations will also need to be carefully constructed, so as to ensure that the customer has the right information to monitor supplier performance.

The customer could consider putting in place a series of agreements between the suppliers (often, referred to as operating level agreements, or OLAs), that regulate the inter-dependencies and performance standards the respective suppliers owe each other. Whilst these are often not legally binding, the customer can oblige suppliers to comply with them.

This means the supplier will be contractually obliged to the customer to provide assistance and meet standards in relation to the other suppliers. In effect, this allows the customer to ‘back-off’ some of the customer responsibilities contained within the agreement, which relate to procuring the assistance of other suppliers.

Where disputes do arise, it may be more difficult for the customer to point confidently at one supplier alone as being responsible. To prepare for such an eventuality, the customer should consider including in the agreements a mechanism to serve a notice of dispute on each supplier and require them to be involved in the resolution of such a dispute. Falling short of this, it would be prudent to include a general assistance obligation that includes the provision of information in the case of a dispute.

The OLA process definition, agreement, implementation, contractual issues can result in delays. If not driven and implemented properly, it might cause a lot of friction across the vendors. OLAs can in fact, lead to a non-collaborative environment if vendors resort to blame games for not being able to meet customers SLAs. It is prudent to first set up a collaborative environment and a collaboration team should drive the OLA process if needed. If a collaborative model is successfully implemented, shared goals help motivate players to deliver efficiency for the customer.

Quantitative Collaboration Model

The collaboration model is dependent on our understanding of what collaboration is, its key characteristics and other factors affecting collaboration.

Collaboration in simple terms means to work together. It is a process defined by the recursive interaction of knowledge and mutual learning between two or more people/teams who are working together, in an intellectual endeavor, towards a common shared goal.

Peterson[5] has identified three distinct states of interaction among organizations:

- **Cooperation:** Fully independent groups share information that supports each other’s organizational outcomes
- **Coordination:** Independent parties align activities and cosponsor events or services that support mutually beneficial goals
- **Collaboration:** Individual entities give up some degree of independence in an effort to realize a shared goal

Exhibit 2 details the key characteristics and factors to be considered for building a quantitative collaboration model.

| Characteristics | Factors |
|--|--|
| Collaboration is intentional, planned and structured | Members share a stake in both processes and outcome |
| Collaboration has one or more specific purposes that are carefully defined and commonly understood | Shared vision, Appropriate cross-section of members |
| Collaboration involves strategic activities specifically designed to achieve the goals and purposes. | Development of clear roles and policy guidelines. Concrete, attainable goals and objectives. |
| Collaboration is based on parity among the participants. | Mutual respect, understanding and trust |
| Collaboration involves interpersonal interaction | Open and frequent communication Established informal and formal communication links |

Exhibit 2: Characteristics and Factors for Quantitative Collaboration

Based on these characteristics, key factors and our experience from working in similar engagements the following model has been developed and implemented. Exhibit 3 describes in brief the collaborative model across the vendors. It starts off with defining the shared goals and ends with continuous process innovations through better knowledge management. Each of the steps in the model is described in detail below.

Step 1: Define shared goals

In a multi-vendor setup, every vendor will have their own goal or drivers in any engagement. A critical factor for success is a common and shared target/goal. The key to the success of any such program is to define and communicate common, agreed, shared goals. Initially customers arrive at program goals. These program goals will need to be discussed with all vendors and shared goals agreed upon. An effective team goal should be SMART. i.e., Specific, Measurable, Achievable, Relevant, Timely.

The goal describes a specific outcome as clearly defined, and unambiguous as possible. We know when we've reached the goal because it is Measurable. Our metrics tell us when we've arrived at success. We will arrive because the goal is Achievable. We have the skills, knowledge and resources to accomplish it. The goal is Relevant to the larger mission of the organization. It's also Timely and can be accomplished reasonably in the intended timeframe. More importantly, all vendors need to appreciate the same and acknowledge the same. Workshops about the same during the initial phases, will definitely help to ensure all teams are on the same plane.

Step 2: Identify key personnel

Key individuals called "Boundary spanners" must be identified who, regardless of title, can motivate and communicate with others. They can facilitate relationships and make or break the operation of the collaboration. It is important that these people be identified and involved. Exhibit 3 illustrates the need of such key personnel from all the parties involved.

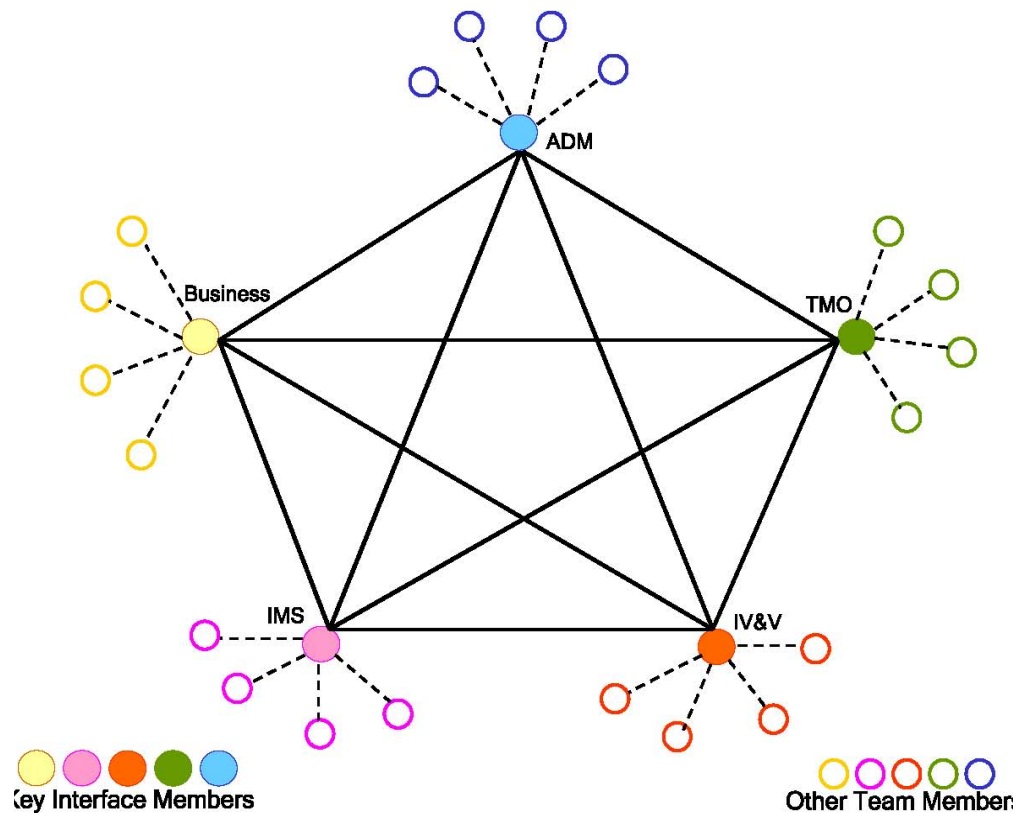


Exhibit 3: Importance of Key Interface Members

The role of key interface members is really important; they serve as conduits for the rest of the team. The key foundation for achieving shared goals is these well-oiled conduits running across vendor teams.

Step 3: Define a structure with TMO's role

In an IV&V engagement that involves interaction with multiple teams/vendors, it is apparent that we need a Test Management Office (TMO) to do life cycle test management and interact with the teams. This TMO should be independent and responsible for collecting the metrics, CDI and thus predicting the health of the project during the life cycle. A simplistic TMO structure is shown in Exhibit 4. The TMO must work very closely with the steering committee or even at a level above that at CIO Technology level. The TMO should be responsible for all testing and QA-related work across the enterprise from the CIO point of view. The focus and collaboration can only be driven if there is enough senior level buy-in. The TMO should have power to drive the necessary work from all vendors teams.

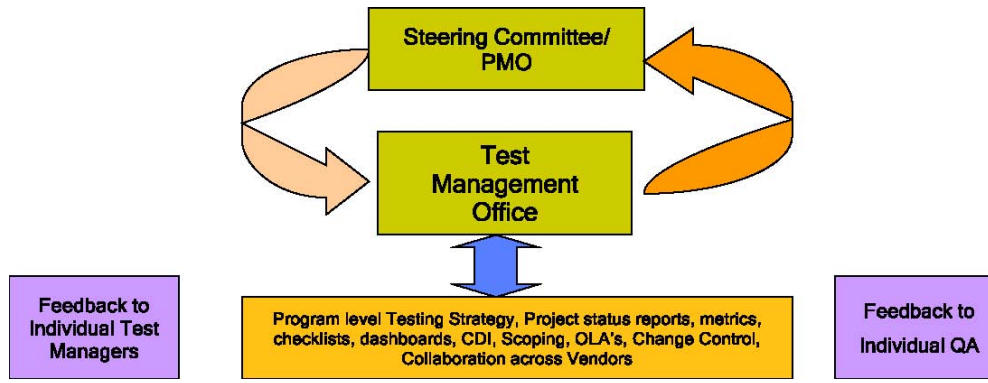


Exhibit 4: TMO Structure

The key activities / responsibilities for the TMO would be:

- Accountability to business
- Set-up right processes and teams
- Participate in scoping of services for all vendors/teams
- Define SLAs
- Provide impetus to the new world of testing independence
- Provide and lead a collaborative environment
- Measure, monitor and predict this collaboration

Step 4: Define key metrics leading to Collaboration Degree Indicator (CDI)

Effective collaboration within culturally diverse multinational coalitions is essential in global IT operations, especially when independent ADM, IV&V, IMS teams etc. co-exist. Unfortunately, effective collaboration is sometimes difficult to achieve within any collaboration team. Methods to improve collaboration, including selecting the right team members, creating the right type of organization, providing the right kind of training, and selecting the right types of collaboration tools, are not fully understood. Therefore, identifying effective interventions and setting up the right governance structure requires experimentation. Metrics, and especially cognitive oriented metrics, which focus on team member understandings, are critical to such experimentation. Such cognitive-focused metrics can measure not only whether particular interventions are improving team effectiveness, but can also illuminate the cognitive reasons for the improvement.

Quantitative measurement for collaboration has been devised keeping all these in mind and the groupings are across three parameters, namely, effectiveness, efficiency and sustainability/predictability. Each of these is detailed in Exhibit 5.

| Dimension | Metrics | Measure | Description |
|---------------------------------|---|---|---|
| Effectiveness | Communication and responsiveness Breach Index (CBI) | 1-4 Between initial level to extremely mature level | Number of violations in responding to email, attending meetings, or following up action points within agreed timeframes |
| Efficiency | Cost Overrun Index (COI) | 1-4 4 for lowest cost overrun, 1 for maximum overrun | (Actual - Budgeted Cost)/ Budgeted Cost Actual effort cost incurred by all vendors + governance team. This parameter indicates efficiency of program. |
| | Problem resolution efforts ratio (PRR) | 1-4 4 for best and 1 for worst | Efforts spent by individual teams or by governance team to resolve problems / Total actual efforts. This is a key parameter that indicates health of program |
| | Idle time ratio (IRR) | 1-4 4 for best and 1 for worst | Productivity of team measured. i.e. idle time of the team is calculated. Irrespective of cause for delays or idle times, individual teams should strive to reduce these innovatively and thereby control cost |
| Sustainability / Predictability | Flexibility Index (FI) | 1-4 4 for best and 1 for worst | Openness to adjust for schedule, scope whenever needed. There could be a cost impact, irrespective of who is responsible |
| | SAI | 1-4 4 for best and 1 for worst | Self Assessment Index from each vendor on: <ul style="list-style-type: none"> ▪ Schedule adherence for providing inputs to other teams ▪ Information sharing ▪ Process compliance ▪ Quality of work product ▪ Innovation |

Exhibit 5: Parameters for Quantitative Measurement for Collaboration

Collaboration Degree Indicator can be calculated as follows:

$$CDI = (4 * CBI) + (4 * COI) + (4 * PRR) + (4 * IRR) + (4 * FI) + (4 * SAI)$$

A CDI Scale can be created out of this number, which should be used for dashboard reporting for the collaborative team and key members to see how to increase predictability and improve efficiencies going forward. For the sake of simplicity, we would like to keep the scale between levels 1 and 4 and provide a visual way to represent the same. Exhibit 5 showcases a sample indicative CDI predictability report.

CDI Dashboard Report – July 2007






| Collaboration Partners | Collaboration Remarks / Drivers | CDI - Level | Key Action Items |
|------------------------|---|--|--|
| 1 ADM - XYZ | <ul style="list-style-type: none"> SIT Smoke Tests requests Meeting on Age of defects |  | <ul style="list-style-type: none"> Action Item 1 Action Item 2 |
| 2 ADM - ABC | <ul style="list-style-type: none"> Code coverage report – meeting UAT and SIT Test plan report – from IV&V Environment needs - IMS |  | <ul style="list-style-type: none"> Action Item 1 |
| 3 IV&V | <ul style="list-style-type: none"> Code Coverage meeting SIT / UAT plan meeting Requirement workshops |  | <ul style="list-style-type: none"> Action Item 1 |
| 4 USERS | <ul style="list-style-type: none"> Requirement workshops Risk / Impact / Prioritization |  | <ul style="list-style-type: none"> Action Item 1 |
| 5 IMS | <ul style="list-style-type: none"> Package / operational acceptance testing needs Environment readiness bottlenecks Other dependencies |  | <ul style="list-style-type: none"> Action Item 1 Action Item 2 Action Item 3 Action Item 4 |

Exhibit 6: Sample CDI Dashboard Report

Step 5: Gain / share learnings

No model would be complete without way to share learning / best practices. Ideally there should be sessions for best practices and a knowledge-sharing portal to enable the model to continuously evolve and lead to higher success rates. Most organizations do have a centralized Knowledge Management (KM) portal. The exact details of the portal are beyond the scope of this paper. Our recommendation is to use the existing KM portal, get access to some space, and build KM into the overall model for achieving maximum success.

Conclusion

We have discussed multi-vendor setups, their models and implications. The need for collaboration in such environment has been explained. Metrics to measure the collaboration amongst the teams or vendors are detailed. Predictability of collaboration is derived to check health of the program at any given point of time. Since team dynamics in different setups are not same, these metrics need to be experimented with and refined to suit the needs of the individual environments. Collaboration contributes enormously to create and establish team chemistry. A process, on the other hand, paves way for mechanized collaboration and facilitates a team's ability to measure its success in deploying a collaborative enterprise. CDI is a way to measure collaboration in a quantitative manner, and is an important step in the complete model for collaboration in the IV&V engagements.

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