



# Key Challenges in Integration Projects

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WHITE PAPER

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The EAI industry has matured enough to solve the integration needs in today's world of specialized application software. It has been realized that over a period of time various EAI projects have encountered certain common challenges.

This paper lists down some of these, make you relate with the problems that you might be facing in your current projects. It also gives a thinking pad to be ready for such challenges in future projects. The data for coming up with this list has been collected from EAI professionals who have worked in a variety of projects for different Fortune 500 clients in business domains ranging from finance, insurance, telecom and service providers to retail, utilities and manufacturing.

## Table of Contents

<b>INTRODUCTION</b> .....	<b>3</b>
<b>REQUIREMENTS GATHERING</b> .....	<b>3</b>
<b>ANALYSIS/DESIGN</b> .....	<b>4</b>
<b>IMPLEMENTATION (BUILD)</b> .....	<b>4</b>
<b>SYSTEM/INTEGRATION TESTING (ST/IT)</b> .....	<b>5</b>
<b>USER ACCEPTANCE TESTING (UAT)</b> .....	<b>5</b>
<b>MAINTENANCE</b> .....	<b>6</b>
<b>PRODUCTION SUPPORT</b> .....	<b>6</b>
<b>DOCUMENTATION</b> .....	<b>7</b>
<b>TRAINING/KNOWLEDGE TRANSFER (KT) / HANDOVER</b> .....	<b>7</b>
<b>OVERALL PROJECT</b> .....	<b>8</b>
<b>BUSINESS TAKEAWAYS</b> .....	<b>9</b>
<b>TECHNICAL TAKEAWAYS</b> .....	<b>9</b>
<b>CONCLUSION</b> .....	<b>9</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>9</b>
<b>ABOUT THE AUTHOR</b> .....	<b>9</b>
<b>ABOUT WIPRO TECHNOLOGIES</b> .....	<b>10</b>
<b>WIPRO IN ENTERPRISE APPLICATION INTEGRATION</b> .....	<b>10</b>

## Introduction

The complexity of an EAI project is greater than other projects owing to the fact that EAI by principle means integrating different applications together, orchestrating them for bringing in harmony into the business. This means that the EAI team has to interact with all the application teams along with the support staff including the system administrators, the network engineers, security engineers, firewall engineers and others. All this adds up to the complexity along with the known fact of unknown problems with the tool vendors. Though the industry itself has matured, the EAI products that are used are always new. This is because of the fast-changing requirements by the end-customers coupled with the ever changing technological advances and the new buzzwords that the vendors want to implement in their solutions. Another important area of concern is the fact that most of the end-customers are not really EAI aware.

In certain cases, it has been observed that the client expects too much from an EAI solution and in others they do not really know what an EAI tool can do, but they still want to use it. While the former creates expectation management problems, the latter can lead to an under-use of the capabilities of the chosen EAI tool.

This paper has been divided into sections describing the most important phases of an EAI project and the challenges most commonly faced in each.

## Requirements Gathering

The most common challenge seen in this phase is the lack of EAI knowledge amongst the application teams and the customers. This leads to either very high or very low expectations from an EAI solution. This makes the defining of the scope of EAI work very difficult. The EAI team has to spend some time to educate the stakeholders about 'what can' and 'cannot' be achieved using EAI.

The other challenge in this phase is to get clarity of the requirements. It is important that the team capturing requirements can articulate the same with maximum details. This would make the work in the other phases comparatively easier. They need to find out the real EAI requirements and not just the interfacing requirements. A case in example is when an application team requested the EAI team to get them 'on the bus'. They were just following a corporate policy, which directed all applications to get on to the EAI bus. The application team did not even know whether the receiver of information from them was already EAI-enabled or not.

Another important challenge in this phase is to get quality time with the application teams and the subject matter experts. The contacts from the application teams should have enough knowledge not only about their applications but also regarding the interfacing requirements. It happens sometimes that the application team lead can re-direct the meetings to some other team members. The problem arises when the assigned team member is not aware of the big picture of the requirements. Also the other part of the challenge is to get an approval of the understanding of the requirements from the actual point-of-contact.

The challenge of coordinating multiple teams generally starts in this phase. Integration projects by definition have a lot of stakeholders, it is very important to get the commitment from each of them. Hence upper management thrust is essential for the success of EAI projects.

## Analysis/ Design

- Over/ under expectations from EAI
- Co-ordination of multiple teams
- Selection of appropriate tools
- Non-standardization of methodologies

Demystifying EAI amongst the application teams and the management is one of the most important challenges during this phase as well. Sometimes the clients may ask for the best fault tolerant or high availability systems even though they might not have the required budget for the same or their business might not really need anything even close to that.

Selection of appropriate EAI tools is, of course, a challenge in itself. Apart from choosing the correct vendor, the new problem has been because of the same vendors now offering different tools for doing similar activity. This has been a result of the recent mergers and acquisitions among the tool vendors, which has led to a slew of new products in the market. New technological advances at a maddening rate are another catalyst to the increase in options. Also another decision to be made is whether off-the-shelf or homegrown adapters/connectors should be used.

Non-standardization of tools and methodologies for EAI design is another challenge. Though EAI has been used for a number of years now, standard methodologies for implementing EAI solutions are still few and far. Though best practices have been captured by many teams and frameworks have been designed to allow for re-usability of components, standardization across the industry has still not happened. This leads to dependency on either the implementing organization, or the implementing team, or the client's organizational preferences, or sometimes even the integration tool being used, to drive the efforts.

## Implementation (Build)

The most important challenge observed in this phase is the dependency on other applications. Most of the times a lot of applications are either deployed or built in the same cycle as the integration. When the project plans are made, teams do consider a lag for the integration part behind the implementation of the respective applications to be implemented. However a small shift in the dates for the implementation of the applications can lead to a lull period for the integration team. Also adding to the problems is the fact that the applications have just been implemented and they have not really been thoroughly tested in this phase. This means that during integration a lot of limitations of the applications are exposed which can be time-consuming to fix. Similarly it is during this phase that limitations of the EAI products being used get highlighted and vendor fixes become another challenge.

Another important challenge in this phase is to use the appropriate tools, technologies, data structures and algorithms for the implementation of the solutions. Most of the EAI tools provide many different ways of doing the same thing. This creates a dependency on the experience of the integration team to use the best options for the implementation.

Configuration management (CM) and traceability of the code to the requirements is another common challenge in this phase. Not all EAI tools have in-built support for the most common CM tools available in the market. Hence, different teams use different ways to manage the same. This leads to another 'non-availability of standards' problem for the EAI domain.

## System/Integration Testing (ST/IT)

- Simulating the production environment
- Moving between environments
- Test case completeness

Probably the most important challenge in this phase is the movement of the solution from the development to the staging area. Not all EAI tools have standard means of moving the solution across environments. Again there is a lot of dependency on the best practices used for the same. Tuning the EAI solution to the expected performance of the application teams becomes a challenge here. Only when applications move into a staging area, they come close to the production volumes that are expected. Hence the EAI solution has to be tuned to provide the required non-functional features. Test data generation for complex mapping of large business documents is challenging. It is not easy to cover all potential risks. Hence the completeness of test cases is a challenge and is further aggravated by the difficulty in getting a sign-off from the concerned teams.

## User Acceptance Testing (UAT)

- Timely Sign-off on test plan
- Test case completeness
- Co-ordination of teams

In this phase most of the problems arise due to the realization that the delivered solution does not meet the requirements of the end-customers. The biggest contributor to this being that the UAT plan is not signed off during the requirements phase. The implementation is done based on the team's understanding of the requirements, and when the solution is delivered to the end-customer, the discrepancies stand out loud.

It is also important that the test plan includes not only the functional requirements but also the non-functional aspects expected from the system. This should include things like the performance, availability, scalability, and other such requirements. If these are captured in the requirements phase itself, the surprises that spring up at the UAT phase can be eliminated.

Another major hurdle in this phase is the coordination of multiple external and internal teams to complete the UAT. This usually happens when the responsibility matrix is not clear. Non-availability of representatives from the various applications and operational teams (owing to scheduled and unscheduled leaves or lack of resources) leads to delays in the UAT phase. Another problem arises because of changing members from the respective teams. It happens many times that the requirements are stated by one of the members and by the UAT phase, the team has been changed completely and the new team might have subtle but important differences about the expectations from the solution.

## Maintenance

- Getting big picture of the solution
- People management issues
- Change Management/version control

The biggest challenge in this phase is to get the big picture of the solution to be maintained. Most of the times, the team that does the maintenance is different from the one that did the implementation. In many cases the entire organization structure for the development and maintenance activities is different. Hence a proper transfer of knowledge not only about the solution itself, but also the business logic and the whole story is essential.

People management becomes important in this phase. Keeping the team motivated is a big challenge in this phase. Coordinating various teams is also difficult.

Change management and version control for the entire solution (and not just the EAI part) is another challenge. It is important to baseline the entire EAI solution at each release point to avoid compatibility issues across versions.

## Production Support

- People issues
- Dependency on vendors/applications
- Reproducing/debugging the problem
- Meaningful SLAs

An important issue in this phase is the dependency on application teams and product vendors. First of all, reproducing a reported bug is very difficult with the users reporting the bug, often not being sure about how it really occurred. The next part is to find out what part of the solution really needs to be changed to fix the bug needs a breadth of knowledge. It is not easy to convince the application teams and even the vendors that the problem lays in their areas. Even after the problem has been agreed to, the time taken by them to fix the same is not within the control of the EAI team.

Another important problem is defining and getting a sign-off on meaningful Service Level Agreements (SLAs). Even in today's mature EAI market there are no standard SLAs that can prove the efficiency of the EAI production support teams.

Obviously, one cannot undermine the challenges of people management in this phase. The teams working on production support generally have complained of having very little work to do for most of the time and whenever there are any issues reported, they have to be fixed immediately. Thus the work puts a lot of stress on the team. At the same time providing '24x7' support with zero downtime is challenging. This necessitates teams working in shifts which can take a toll on the members.

Other issues include setting up the offshore-onsite model for the production support. Not many companies today have mastered this aspect of value addition to their customers. Smart teams have managed to use this model to their advantage, making sure that they get to use all the 24 hours in a day by having teams working at different time zones.

## Documentation

This phase covers the documentation of the solution, the maintenance guides, the user guides, etc. and not the documents like the RS, ISD, DD, code documentation, TP and TC etc. which are considered deliverables for the respective phases.

The documentation is only as good as the documenting team. Well, this statement has some truth in it, largely because of the lack of standards and tools available for the documentation of EAI projects. Teams often fail to differentiate technical documents from the operational and business process documents.

Another important dampener for this phase is that it is not always planned and estimated at the beginning of the project. It is an implied part of project execution and is not explicitly stated. Hence there tends to be a loss of focus on this phase. Also this phase happens to be the first casualty of time and effort constraints. People try to shrink the time spent on documentation to buy time for the actual implementation. This also leads to limited or no reviews of the documents produced by the team.

Base lining the documents, version control and change management are the other challenges in this phase. Traceability of the documents to the requirements is not easy. Another challenge is to update the documents after every change to the solution (which may arise either due to new requirements or new releases of the EAI products being used).

## Training/ Knowledge Transfer (KT)/Handover

- Right Resources for handover
- Involvement from start
- Technical team training operational staff
- Capabilities of trainers and trainees

The biggest challenge in this phase is probably getting the right resources to receive the knowledge transfer. Getting the client teams involved right from the beginning of the project is a challenge in itself. They should at least be aware of all the design and implementation decisions that are taken throughout the lifecycle of the project. This would ensure smooth handover after the implementation.

Another important challenge for the technical team is to train the operational staff. Their jargons and terminology is very different from what the technical team uses. What might be very obvious to the technical team may not be so for the operational team and vice versa. For example, when a solution was delivered for an electronic trading system, the client expected the technical team to impart training on how to use the new system to the end-users. The technical team soon realized that when they had to do a KT for their solution, the training pitch was very different from what had to be spoken about to the end-users. The technical team needs to be told the difference between an order and an execution while the end-users need to be told when to click the 'Send' button.

The team imparting the training needs to be focused and capable enough to do their part. Similarly the team getting trained should be serious in getting the same and should make optimum use of the resources available to them. The trainees might not be serious enough with the solution that they are being trained on. Unlearning the current way of working might not be very easy for the trainees. For example, in the above mentioned case, the end-users found it more time consuming to enter the trades on the new system than calling up the floor and placing the order. This was due to their resistance to change.

## Overall Project

Apart from the challenges listed above, there are some that crop up throughout the lifecycle of the EAI projects.

- Getting the big picture of the solution
- Building the EAI framework
- People management issues
- Lack of standardization of tools/methodologies
- Lack of EAI knowledge amongst management
- Support from upper management
- Calculating & justifying ROI
- Technological problems

The biggest identified challenge is to get the big picture of the solution. Not only should the big picture be identified, it should be generously shared with all the stakeholders. This would make sure that everyone is aligned with the common vision of the project.

Convincing the management about the complexity of the EAI requirements is another challenge. Managing the expectations of one and all can be a difficult task. Getting the support from top management to get the commitment from all the stakeholders is very important and not easy.

Till today, there are no proven standard tools of calculating and justifying Return-On-Investment (ROI) on EAI projects. Though some attempts have been made by several organizations to provide tools for the same, the standardization across the EAI industry is still lacking.

Individual organizations have come up with their own best practices and methodologies to implement EAI solutions. However, though the industry is mature enough, as it claims to be, still needs standard tools and methodologies to make EAI more of a science than an art.

Also, worth mentioning are the technological problems which EAI is supposed to solve. These include common requirements like transaction processing, monitoring & alerting, sequencing, security, globalization, character encoding, etc. These are implemented differently by different products and hence today it is dependent on the capabilities of the implementation team to do it correctly and optimally. The vast availability of a large number of tools and technologies to achieve the same has made things more complicated.

## Business Takeaways

- The challenges in EAI projects are much more demanding than those in other IT projects
- Planning contingencies for these challenges is crucial to success
- This should help the business to plan for adequate time and budget for EAI projects
- Highlights the need for using experienced teams for the implementation

## Technical Takeaways

- Need for standardization of tools/methodologies etc.
- Need to demystify EAI to the business users and the application teams
- Need to articulate the functional as well as non-functional EAI requirements
- Need to do a thorough exercise for evaluating and selecting the tools to be used for the implementation

## Conclusion

Though EAI as a concept has matured enough, we still do not have the 'standards', whether it is tools or methodologies or estimation techniques. This has led to the dependency on the integration expertise of the implementation team. Today, the best way to get an integration project successfully implemented is to use the expertise of an experienced team who has seen it all and done it all. The need of the hour is to transform the mitigations for the above crucial challenges into an integration discipline.

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## About the Author

The author, **Rohit Khanna**, has over six years of experience in developing IT solutions. He has completed a Post Graduate Specialization in Software Technology and earlier completed his graduation with a B.E. in Electronics. He has been working with Wipro Technologies for the last 5 years. As part of the EAI practice of Wipro, he has been consulting for clients in the insurance, retail, telecom and finance domains. Currently, he is associated with a large financial services company in the US.



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