



ARCHITECTING PROJECT MANAGEMENT

for Enterprise Agility...

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Organization Design to create an Agile and Evolving Enterprise

Team Structure Alignment aimed to Improve Agility

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Author: Ms. Meenu Sachdeva

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ABSTRACT

Agile organization is able to adapt, absorb and respond quickly to the changing demands from the customer. What is continuously needed is to keep the practices evolving and adapting. Sometimes, sustenance in the dynamic environment itself becomes a challenge and if significant changes are not brought from time to time then existence is also not guaranteed. I had a similar situation in one of my projects wherein prioritization of the changing requirements along with on time delivery became the major parameters for judgment, not to leave the quality and customer satisfaction aside.

In this scenario, we needed to make significant changes to the team organization (internal as well as at the interface level) to make sure that there is a smooth flow of activities from the start until the end.

The workflow was studied and all the parameters were measured to identify the focus areas. As there is no one solution that fits all, each of these areas were dealt one by one. While the customer has to be aligned and taken into confidence at all stages, adequate steps are being taken to make sure that the team is always ramping up to meet the ever changing requirements from the customer. Along with delivery, constant attention is paid to the competence build-up of the team. In the process, everyone grows up the value chain and team is eventually able to increase their throughput.

Author intends to present the organization design that was brought in to reap the maximum benefits.

INTRODUCTION

The major challenge in the multi-site software development lifecycle is to be able to bring coherence between the teams in order to optimize the development time and be able to balance between the varying demands of various customers. The context of the current project is similar wherein a team of competent engineers working on the software development of an embedded system. The challenge is - this team is not directly working for one customer but gets the requirements from various customers through well identified Customer Interface-teams (hence referred to as CI teams) that act as a liaison between the customer and the development team. In effect, there are multiple stakeholders involved at any given point in time to be satisfied. While the development team in focus does not have any direct commitments to the customer, but the commitment is towards the CI teams. The CI teams in turn have commitments to the customer and responsible for understanding the requirements from the customers, their timelines and milestones. CI teams are then responsible for delegating the work to the development team (depending on the topic experts) and be able to integrate the various parts of the software, once development is completed. After the extensive validations are performed, CI team releases the software to the customer. This looks like a very smooth and well defined structure, which, in effect, is also a very streamlined workflow model but the challenge is to satisfy the needs of all different stakeholders (read it as different customers) in case of clashing and demanding timelines. Since the throughput of the team is high, adequate attention is not paid to the competence development of the team. Hence, additional objective is that the technical team should be groomed in such a way that they become the experts of not only a limited number of topics but they should have a wide angle view of the complete software going inside the product.

This paper is oriented towards taking you through this journey of problem identification and resolution leading to some conclusive results.

DETAILS OF THE PAPER

A four staged approach was used to solve the problem, right from questioning ourselves (Is there really a problem?) then, defining what the real problem is, determining the extent of the problem, designing a solution to the problem and measuring if the solution is effective (depicted in Figure 1)



Figure 1: Problem Solving

STAGE I: DOES A PROBLEM EXIST? – PROBLEM DEFINITION

Won't it be wrong to assume that a problem is existing in the current structure of the team without any comprehensive study? The development team in question is a team of highly competent experts in their topic and has been churning out the throughput at the desired rate. But a constant fatigue faced by the members (due to high demand from the customers) and Project Manager getting into constant negotiations at the stage of planning (also at the later stages) throughout the year were some of the symptoms that forced us to pay a closer attention to the team. This enabled us to trigger the thoughts about corrective and/or preventive actions to be planned. This led us to the stage of defining the problem clearly – Since there are increasing demands from the customers, multi-tasking was a usual practice leading to too much of context switching between two or more tasks, affecting the quality and quantity of the work. There are lot of items in "Work in Progress" stage and increasing demand for short term requirements to be responded in a quick time frame.

Problem can be viewed pictorially in the Figure 2

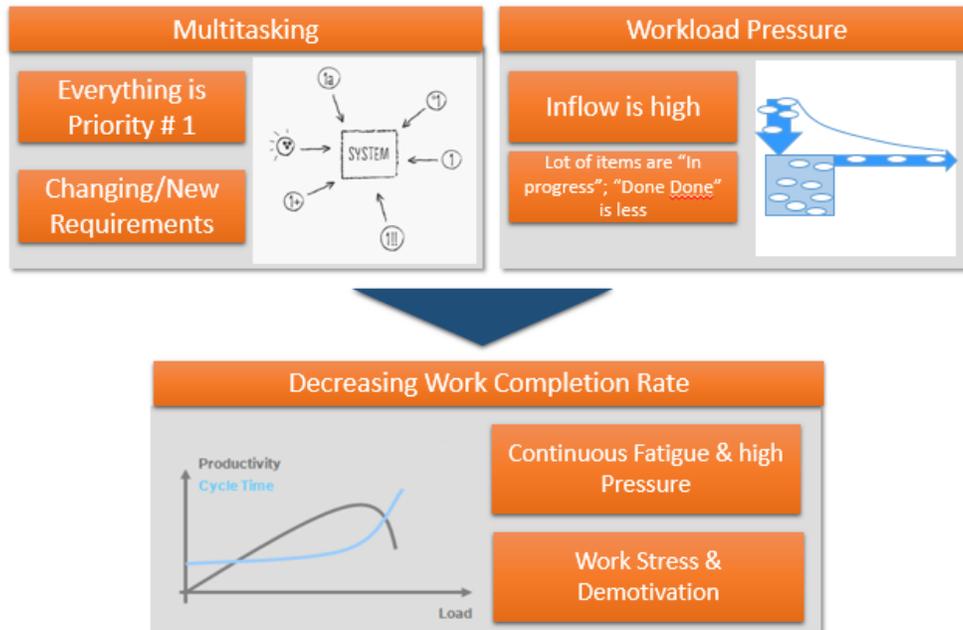


Figure 2: Problem View

STAGE II: QUANTIFYING THE PROBLEM

It is extremely critical to pin-point the problem before jumping into the solving stage. Various Tools and techniques (T&T) were used to determine the focus areas of the improvement. Both the associate and the customer view were used as an input to identify the problem in depth.

Various tools and techniques used are:

1. Skill Matrix
2. Determination of extent of Multi-tasking
3. Focused Workshops
4. Employee Surveys
5. Customer Interviews
6. VSDiA (Value stream diagnostic for indirect area) workshops

Details of T&T used during Problem Identification Phase (Table 1):

Tool	Purpose	Result
Skill Matrix	Performance Indicators to understand team organization and current Skills levels	Determined the current Performance level as ^95%

Tool	Purpose	Result
		(average); however target performance level based on potential as $\pm 104\%$. The variability is calculated at $\pm 9\%$
Multi-tasking Determination	Tool to determine where the team stands w.r.t demands from the customers, task prioritization, skill distribution, ability to handle parallel tasks and capacity management	This value was determined to be at $\pm 14\%$
Mirror Workshops	Purpose is to capture the voice of the associates in the working environment. This showed the mirror to the direct and indirect supervisor on the areas to be focused upon.	Associates demanded a structured competence enhancement program and improved planning to enable a better work-life balance
Employee Surveys	Method used to understand the mindset and behavior of the team	Uncovered the pain areas for the associates in day to day working conditions and customer collaboration
CI Team Interviews	CI teams were interviewed to take feedback on service, Quality & Improvement areas	CI teams commented on the Quality, cost, delivery and collaboration parameters
VSDiA Workshops	Purpose is to determine what are the pain areas in the development lifecycle and determine the overall actual cycle time versus ideal cycle time	Determined the overall processing time segregating Value, Waste and Support (reflected in Table 2)

Table 1: Tools & Techniques

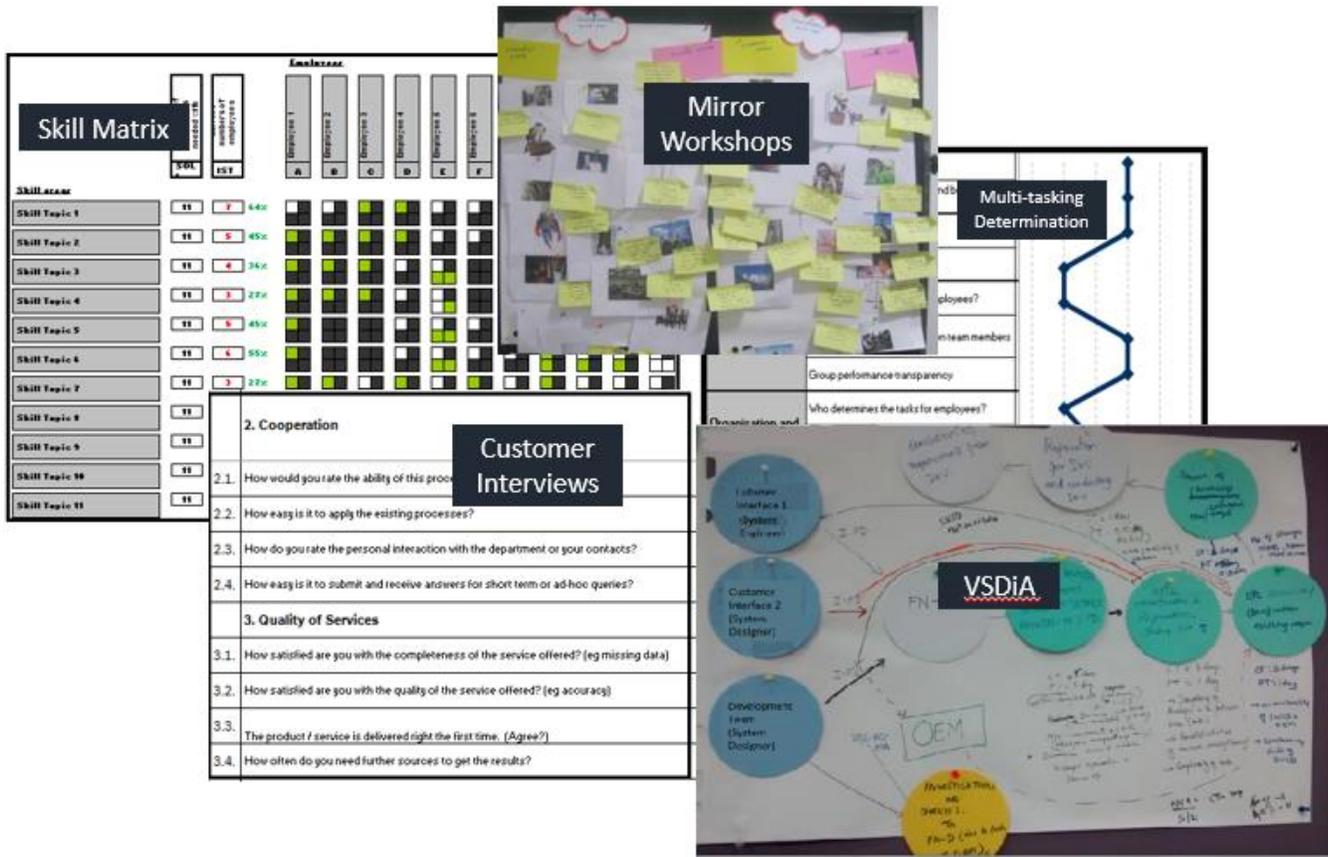


Figure 3: Output of Tools & Techniques Used for Problem Quantification

Quantification of the problem was done by means of conducting VSDiA workshop. Results are mentioned in the Table 1: It is clear that there were multiple transactions leading to considerable waiting time, changing requirements from the customer leading to re-work and waste is measured high (~ 14.5%) (Kindly note this is just an indicative figure and actual figure cannot be disclosed due to confidential reasons)

Activity (Value / Support)	S.No.	Role	List of activities	CT^ Cycle Time (Hrs)	PT^ Process Time (Hrs)	Non Value Added, NVA (CT-PT)	NVA1 (CT-PT)- applying correction factor(70%)	Waste^	Comments / Issues
NA	START		Creating a request in Request Management tool and delegating the request to Development team						
Value	1	Developer	Initial analysis of requirements	42.5	35	7.5	5.25	2.25	non availability of expert, competency issue,discussion across multiple locations, incomplete requirements
Support	2	Developer	Query identification & preparation,sending queries	25.5	17	8.5	5.95	2.55	Competency of a developer; parallel activities e.g. reviews,meetings/training, Complexity of task
Support	3	Developer	Discussion of queries and requirements	42.5	30	12.5	8.75	3.75	Unavailability of expert & delay in response to queries
Waste	4	Developer	Rework of analysis new/changed req	8.5	6	2.5	1.75	0.75	Changing requirements from the customer
Support	5	Developer	Kick-off for implementation	8.5	6	2.5	1.75	0.75	Lack of availability of reviewers
NA	End	Developer	Conclusion of Requirements understanding after Kick-off meeting						Investigation requests in between
Total				127.5	94	33.5	23.45	10.05	
				Value	Support	Waste			
				40	69	19			
Percentage^				31.4%	54.2%	14.5%			

[^]Indicative values, not actual values for confidentiality reasons

Table 2: VSDiA Results before any Changes in the Team

Conclusion as derived from the usage of all the above T&T:

All the tools and techniques helped in quantifying the extent of the problem and forced the management to look at the weaknesses of the existing structure

The initial team structure appeared as (Figure 4):

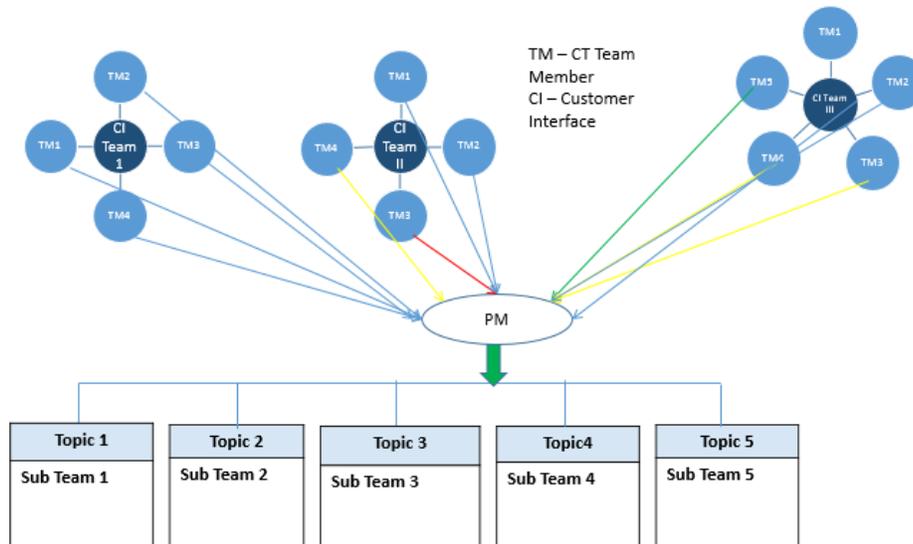


Figure 4: Initial Team Structure of the Development Team

Following are the clear depictions from the above picture:

1. Requests are directed to one person from various CI teams and are delegated to the development team from a single person (Project Manager, PM)
2. Requests from different CI teams could be conflicting in terms of clashing timelines and overlapping of requirements
3. There were bottlenecks in technical understanding of the requirements as only the PM is the single point of contact to understand the requirements
4. Team, on the other hand, is always in the fire-fighting mode because of a high in-flow of requirements
5. Team members may be working on repetitive tasks from different customers or may be working on new requirements all the time, leading to a situation where their competence build for a particular topic is paid less attention as the focus is on completion of the requirements

STAGE III: DESIGNING THE SOLUTION TO THE PROBLEM

The above problems led to the origin of a concept called as “Component Team” (CT) oriented towards a particular customer yet connected as “One team”. The idea was to align the current structure of the team in such a way that the distance between the customer, CI team and development team can be reduced in order to:

1. Improve Customer Focus
2. Reduce the existing number of Communication Channels
3. Requirements Prioritization (conflicting timelines)
4. Increase breadth of experience for the development team (Realization of a “Comb-Shape” engineer)

COMPONENT TEAM (CT) STRUCTURE:

The existing team is re-aligned aimed to improve the overall agility of the execution called as “Component Team structure” (from hereby referred to as CT-Structure) depicted in Figure 5.

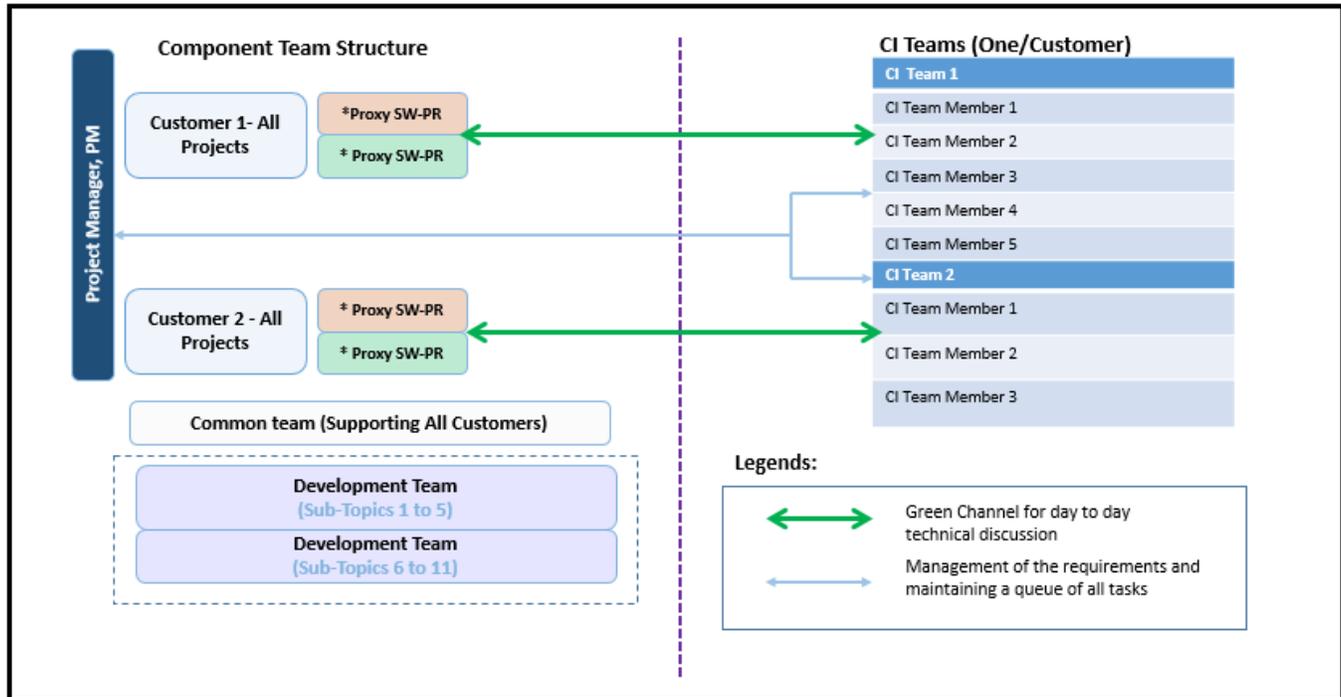


Figure 5: Component Team (CT) Structure

Salient features:

1. Introduction of a role called as Proxy Software Package Responsible (hereby referred to as “Proxy SW-PR)
2. Provision of a Conflict Resolution Platform (“Prioritisation Discussion)
3. ROG (Red-Orange-Green) Boxed Method for design and implementation
4. Work Tracking through “White-Board” Meetings
5. Definition of RASIC (Responsible-Accountable-Support-Information-Consult) Chart
6. Structured Competence Build up plan (Comb-Shape Engineer)

Proxy SW-PR (Software Package Responsible) is defined for the set of Software packages per CI team. Proxy SW-PR is the first technical single point of contact (SPOC) for understanding the requirements from the end customer along with the member of CI-team. This not only reduces the burden on the Project Manager but also enables Proxy SW-PR to get the clarifications from the customer and be able to judge the feasibility of design and implementation at the Requirements Elicitation stage itself. The loss of information due to 3-level transaction is greatly reduced (Compare the communication channels between Figure 4 and 5, its four versus one after the Team alignment)

Certain KPIs are defined for Proxy SW-PR which are measured week-on-week to observe the improvement.

KPIs are:

1. Query Turnaround Time (Customer queries) – in days

2. Participation in Meeting with Customer (Number)
3. Requirement Review Meetings with Customer (Number)
4. Design Review Meetings with Customer (Number)
5. Tasks handled topic-wise by respective team members (based on their On the Job competence plan)

With the revised team structure, new workflow (ROG Boxed Method, Figure 6) to handle the requirements was introduced:

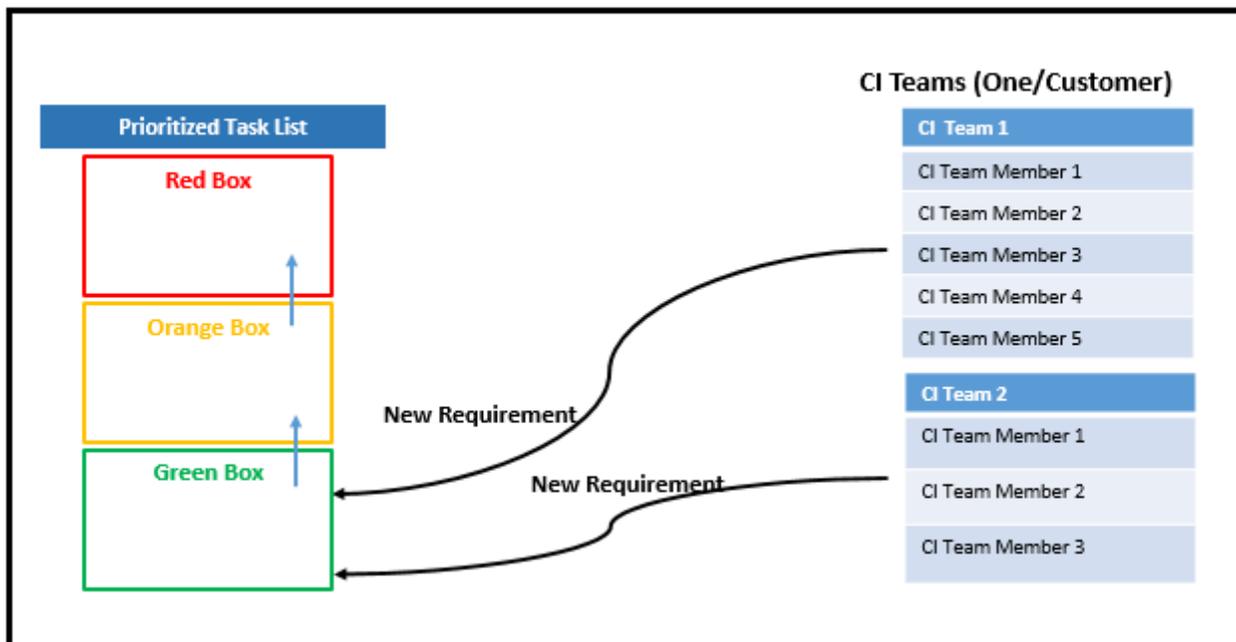


Figure 6: ROG (Red-Orange-Green) Boxed Method

The workflow is:

1. Once new requirement is assigned to the Proxy SW-PR, this will immediately go in the Green box.
2. Depending on the current engagement of the development team and the clarity of requirements, it shall be moved from Green to Orange or Green to Red.
3. If the request cannot be entertained (e.g., all developers are busy with tasks in Red box, then the new entries remain in Orange box itself).
4. If the requirements are very clear and the team is able to start with the development, then, they are moved to Red box for implementation.
5. Prioritized task list is available for everyone to see and this increases the transparency to CI-team to determine the current status of the task.

General protocol to be followed is “First in And First Out” (Committed Release Dates to the customer shall also be looked into for prioritisation).

In order to resolve the conflict in terms of Prioritisation, e.g., if the high priority task needs to be urgently addressed and there is no developer free to address this request, then, the requestor has to call “Prioritisation discussion” between all the stakeholders from CI-team for different customers, involving Proxy SW-PR and SW-PR. All stakeholders have to decide where this urgent request needs to be accommodated. This implies some of the “ready to be implemented” item from Orange box should not go to Red box but this new item has to move to Red box (provided requirements are clear). Focus is on NOT touching any item in Red box

Line managers from the respective location can moderate these discussions to arrive at a conclusion of what should be considered as a priority.

WHITE BOARD MEETINGS:

The CT structure was facilitated by means of Whiteboard Meetings (Figure 7) and KPI tracking. Project whiteboard is designed and with a daily connect of 15 mins at a fixed time of the day amongst all the members of the development team. The members update the progress of the task and also highlight the operation problems alongwith the support needed from each other in order to meet the commitment.

- Benefits are:
- Structured information exchange in whiteboard meetings
 - Improved capacity management
 - Accelerated and efficient information exchange
 - Problem Solving



Figure 7: White Board for the Development Team

Daily performance review to:

- Identify Issues/hindrances
- Review KPIs
- Workload allocation
- Plan problem solving sessions (need based)
- Capture Mood of the team via ☺, ☹, 😐 and identify the reasons of dis-satisfaction
- Sharing of best practices on the board as “Tip of the day”

STAGE IV: MEASUREMENT OF THE RESULTS

After the implementation of this CT structure, VSDiA workshop was done again to see if the overall situation has improved. Table 3 shows the results of the same. It is clear that there is a visible reduction of waste by ~5% and non-tangible benefits gained are - improved motivation level of the team, lesser stress and reduced number of escalations and complaints.

Activity (Value / Support)	S.No.	Role	List of activities	CT [^] - Cycle Time (Hrs)	PT [^] - Process Time (Hrs)	Non Value Added, NVA (CT-PT)	NVA1 (CT-PT)- applying correction factor(70%)	Waste [^]	Comments / Issues
NA	START		Creating a request in Request Management tool and delegating the request to Development team						
Value	1	Developer	Initial analysis of requirements	30	24	6	4.20	1.80	Improved availability of expert, better competency, better clarity on requirements
Support	2	Developer	Query identification & preparation, sending queries	15	13	2	1.40	0.60	Competency of a developer; less parallel activities
Support	3	Developer	Discussion of queries and requirements	30	25	5	3.50	1.50	Availability of expert & better response to queries from customer
Waste	4	Developer	Rework of analysis new/changed req	4	3	1	0.70	0.30	Changing requirements from the customer
Support	5	Developer	Kick-off for implementation	4	3	1	0.70	0.30	Better availability of reviewers
NA	End	Developer	Conclusion of Requirements understanding after Kick-off meeting						lesser interventions in between
			Total	83	68	15	10.5	4.5	
				Value	Support	Waste			
				28	47	9			
			Percentage[^]	33.9%	55.9%	10.2%			

[^]Indicative values, not actual values for confidentiality reasons

Table 3: VSDiA Results after Team Alignment (CT Structure)

SKILL MATRIX:

Skill Matrix was updated and certain improvement was seen in the skill level of various employees on the various topics. It was observed that employees' competence is taking ^Comb Shape, rather than just focussing on one or two topics. Main contributing factors to the skill level enhancement are:

1. Structure planning enabling developers to continuously work on the same topic for 3-4 developments inline

2. Establishing a mentor-mentee relationship between the expert of the topic and the developer learning the topic (On the Job training)

3. Classroom training programs on specific complex functions organized by the experts in the team.

^COMB-SHAPE:

The vertical bars (Figure 8) represent the depth of the related topics/software packages whereas the horizontal bar represents the breadth of knowledge across the topics/software packages in order to collaborate across the topics where an individual does not have in-depth knowledge.

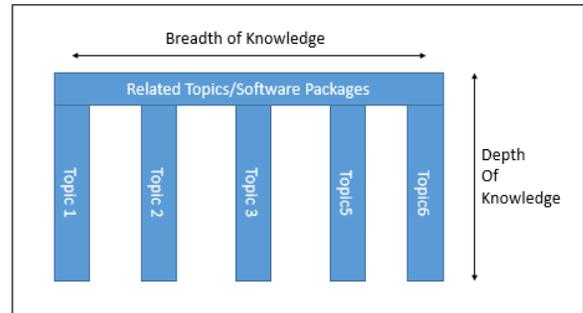


Figure 8: Comb-Shaped Skill Pattern for an individual

CONCLUSION

Overall this structured approach enabled the team to achieve the following:

1. Drastic reduction in communication channels by defining Proxy SW-PR for each Customer
2. Improved focus on Customer (Proxy SW-PR made part of CI team discussions & be informed of all major milestones in customer projects and technical involvement n day to day discussions)
3. Prioritization could be better resolved between team members of CI teams for different customers (if conflict arises)
4. Enabled Competence Buildup of development team (realize “Comb shaped” Engineers, focusing on identified topics for individuals)
5. This also led to improved harmony, better relationships with CI-teams, increased throughput and lesser number of complaints.

This is an on-going activity and benefits shall be reaped from time to time. This is not the end but a beginning to a more structured approach of project execution by means of improved “Team Alignment” leading to Agility in the system.

REFERENCES

The paper is from the real working experience on the tools and techniques used by the author in the project in discussion.