PalArch's Journal of Archaeology of Egypt / Egyptology

A STUDY OF AGILE INTRODUCTION IN MANO TRANSFORMATION

[1]Atul Narain, [2]Dr. Pratibha Garg

[1]Research Scholar, Amity School of Business, Amity University,atul.narain@student.amity.edu

[2]Astt. Professor , Amity School of Business, Amity University, pgarg1@amity.edu

Atul Narain, Dr. Pratibha Garg , A study of Agile introduction in MANO transformation -Palarch's Journal Of Archaeology Of Egypt/Egyptology 18(4), ISSN 1567-214x

Abstract: There is a major change undergoing in telecom today, as a result of which there is a shift towards cloud-based deployment from traditional native approach. MANO defined the cloud orchestration approach for ease of deployment and automation in a cloud environment. Today both for telecom operators and telecom vendors providing the network software and equipment, the target is to improve the ease of deployment so as to remain ahead of competitions and as well as ensure quick service introduction. This study focuses on adoption of agile methodology for enabling cloud orchestration. There is a scope of improvement that is observed when we bring in Agile methodologies. Also the current challenges indicate that the present methodology is not enough to achieve the transformation at the rate at par with which the rapid development of the converged services and technology is happening. A significant proportion of organizations focusing on cloud-based infrastructure transformation follow and combines some IT management frameworks e.g. ITIL. At the organizational level, they often act in accordance with ETSI MANO or TM Forum defined standards which talks of people, process, tools, information and integrations. The purpose of this paper is to define how integration of Agile into ETSI MANO can improve efficiency in the telecom processes and present a methodology for Telco business process transformation harmonizing ETSI MANO and Agile.

.

Keywords: Agile, ETSI MANO, TM Forum, Process Transformation, Framework

1. Introduction

i.Agile Methodologies

Agile methodology claims to have increased customer satisfaction by delivering Higher quality products and enabling incorporation of changes in requirements without delay in development time.

As discussed in Agile Summit 2016 from Project Management Institute (PMI) The need for change for enabling organizational agility, (Lange, Blotny, & Magedanz, 2011)Telco companies are reframing their Organizational, People and Process cultures and practices in following ways:

- ✓ Focusing on Changing Market and adapting them to embrace the management of fore coming changes.
- ✓ Risk management Focus
- ✓ Standardized way in implementing Project Programs, Portfolios and practices

Agile Alliance defines agile development as a set of methods and practices as defined within Agile Manifesto based on its values and principles. (AgileAlliance, n.d.)

Agile enables an organization to incorporate and develop new change in order to deliver on time and create success in an uncertain environment which depicts client's requirements.Agile Software Development is a collaborative term for a set of rules, methodologies and practices which are based on the values and principles mentioned in the Agile Manifesto.(Here add reference from agile alliance)

Agile frameworksfollow a manifesto and core principles. In order to be considered Agile these principles and manifesto should be followed. The agile values stated in the Agile Manifesto are:(Kent Beck, n.d.)

- Individuals and interactions over processes and tools
- Working products over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Agile values individuals and interactions more. As per complexity of a delivery, it is important for organizations to have a knowledge base which is kept updated based on knowledge learnings from different projects and can serve as a reference for people to learn and update themselves. These best practices and knowledge shares become the foundation.

Basic agile framework can be adopted by any organization initially and then bring in its knowledge base or additional processes and documents that is required for delivery, however caution needs to be taken that the new processes and knowledge base implementation should bring value or efficiency to the delivery cycle of the project.

Here are the 12 agile principles:(12 Principles Behind The Agile Manifesto, n.d.). The below are reworded for simpler understanding on the same.

1. The most important aspect is satisfaction of the customer by enabling early and continuous delivery of the project.
2. During the later stages of the project also, agile approach welcomes changes as these changes can be harnessed for the customer's competitive advantage.
3. Enables frequent delivery of the working product where the preference is always short time lines and the delivery can happen anywhere between 2 weeks to 2 months.
4. There is a strong collaboration between the business and the developer community working together daily throughout the project.
5. The key aspect is to enable motivated individuals with the environment and support they need and trust them to complete the project

6. Rely more on face to face collaboration and communication with the development team to make them understand and effectively take back requirements for development and deployment.
7. Plan on a viable working product which should define the progress on the project.
8. Since the aim is to promote sustainable development, the user community can continue in that mode for as long as they wish.
9. It is a continuous loop of improvement with every cycle of development, resulting in agility and excellence.
10. Simple is better.
11. Self-organized teams also bring in the best practices.
12. Teams to continuously review on ways of working and how to effectively improve

ii.MANO

MANO is an open source initiative aimed at developing an Open Source NFV Management and Orchestration (MANO) software stack. It is an initiative hosted within ETSI and is aligned with ETSI NFV.(ETSI, n.d.)

An orchestration is the configuration, management and coordination, of computer systems and software in an automated manner.(Wikipedia, n.d.)Several tools exist for such automation for server configuration and server management. It includes Puppet,Ansible, , Terraform , Salt and AWS CloudFormation. Kubernetes are solutions for container orchestration and for managed services we haves AWS ECS/EKSor Amazon Fargate. (Wikipedia, n.d.)

“Orchestration is discussed as service-oriented architecture enabling provisioning, virtualization, , dynamic datacenter and converged infrastructure topics. Orchestration is into alignment of business request with the application’s infrastructure and data. The main differentiator is a workflow stating an "automation" and an "orchestration”. These workflows are initiated

and completed as processes for automation purposes in a single domain. However, orchestration talks about a workflow and it provides a directed actions leading to larger objectives and goals, aiming to achieve specific objectives and goals which are mentioned via service parameters with quality

NFV Orchestrator and VNF Manager are the two different functional aspect which together form the ETSI NFV architecture. This NFV architecture for the NFV MANO and aspects like service orchestration form the additional layer whichare required to enable NFV services.For development of open source NFV Management and Orchestration stack, ETIS has a specific group OSM (ETSI's Open Source Mano) which uses well established working procedure and open source tools.(Younas, Ghani, Jawawi, & Khan, 2016).The OSM group collaborates and enables an eco-system of NFV solution vendors to rapidly deliver solutions to their users in cost-effective manner. Its activities are also aligned to evaluate ETSI NFV and publish references for implementation of NFV MANO(Vikas Sajjan, 2017)

Both ETSO NFV and ETSO OSM complement each other.Activities like publication of references etc, by ETSI OSM helps harmonize on the aspects of monetizing on the synergy between open source approaches and standardization.

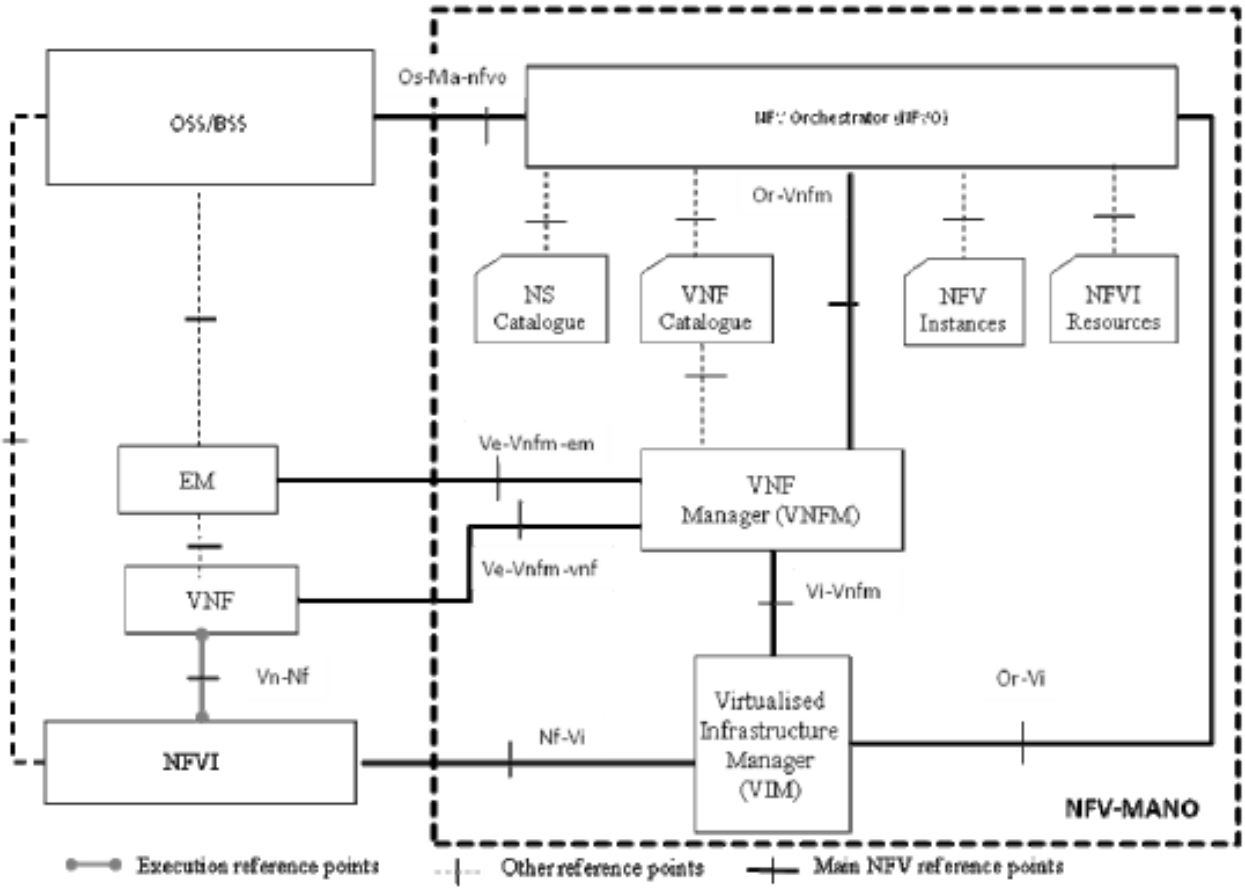

Figure 1: MANO Framework

NFVmanagementandorchestration(MANO)supportsenhancedinfrastructureand serviceagility,so that networkstakeholderscanconfiguretheirnetworkfunctionsregardless of hardware equipment for example firewall, the virtual router on standard commercial hardware platform by software. NFV enables and ensures the more efficient utilizationofresourcesand better service agility.InNFV,anetworkservice(NS)maybeable to disassemble into several virtual network functions (VNFs). (Lee & Kim, 2017)A VNF can be deployed in pure software operating on severalstandardcommercialhardwareservers.Maintenanceand updatestonetworkfunctions(NFs)canbeconducted remotely and at massive scale.

In virtualized environments, resource allocation is dependent on the computing resources required, however there are far more complexities involved for network allocation. For example, some VNFs require high bandwidth links or low latency to other communication endpoints. (*How does Agile apply to NFV and SDN*, n.d.)

Allocation of resources and its release is a dynamic process. Aspects like resource allocations and releases may be required throughout the VNF lifetime whereas the orchestrations function and management for virtualized infrastructure are VNF-unaware. NFV has an advantage that whenever a scaling out is initiated because of the consumption of services, the allocation can happen automatically for the increased demand of resources. (ETSI GS NFV-MAN 001 V1.1.1 (2014-12) 2.)

2. How do MANO and Agile Integrate:

MANO shares an excellent framework, to synthesizeand automate configuration, coordination, and management of computer systems and software and orchestration of value-add services to customers that continually evolve.

While the technology & environment is constantly evolving, Agile can be used to enable faster delivery of services and deployment in a cloud environment.

Orchestration today is an evolving technology and today transformation is happening mostly by the book resulting is rather long cycles of deployments and with the focus more on deploying it as per MANO. However, the environment and complexity of such transformation from legacy to cloud keeps changing at a very random and fast pace.(Almudarra & Qureshi, 2015) Agile is more adapt to be used in environment which are complex and chaotic and where there are frequent changes. (Heavy Reading, 2014). If we compare this to orchestration, there also the focus is on to continually improve.

The key objective in any transformation from legacy to cloud is of course to reduce cost and time and achieve automation as much as possible. Within MANO, this means orchestrating services within the least lead time between a service request or the scaling requirement and the service becoming available via service orchestration.(Borangiu, Drăgoicea, & Nóvoa, 2016)

Agile is a good approach to delivery and helps in reduction of cost, time to deliver and quality of service. Agile focuses on achieving orchestration within 'vertical slices' or short lead times as they are known. Vertical slicing is method of decomposing big problems into smaller ones so that they can be focused on and tackled. When we adopt agile, the ambition is to go in production with one or more of the slices within short lead time (weeks)(Heavy Reading, 2014)

Agile thinking canenable the lead time from the customer's perspective across the whole of the MANO framework. Agile should be implemented across the entire project life cycle and across the whole delivery process and not just one single part or process. A typical place to start integrating agile in MANO is within Service Orchestration and Auto Scaling; in essence, delivering the changed service in an agile way. So if we apply Agile to only one part of Orchestration cycle, then there is a risk that the time to deliver may not reduce but rather take longer. Although agile is supposed to reduce time, however if applied in parts, the entire cycle of gathering business requirement and ensuring delivery for a single part may still take long. otherwise speaking just changing one part of the delivery chain may or may not benefit the customer.

If we consider the initial agile transformation into the service orchestration area between Design and Transition, then the projects, programs and portfolios delivering changed services can all be focused and improved by using agile.

MANO defines the orchestration as complete cycle of instantiation and scaling of VNF's as well as discovery and management of the VNF. Each VNF lifecycle typically includes initiation, deployment, scaling, update and

termination". This definition is very similar to ITIL definition of projects. The Project Management Office (PMO) is anotherarea taken in consideration as part of this study. As per ITIL viewpoint, the purpose of the PMO is "to define and maintain the service provider's project management standards and to provide overall resources and management of IT projects". Both design coordination and transition planning support formulate the couple of different processes combined as part of PMO. While design coordination is more focused towards formulation of service design package, transition planning support is more focused towards successful implementation and change requirement of IT services. (Bertrand Verlaine, 2016)

MANO manages the life cycle of a VNF leading to discovery, instantiation, updates and scaling. However, creation and modification of VNF is not directly managed by MANO. So MANO may orchestrate and manage life cycle however it does not directly manage the requirements, scaling etc. The below figure illustrates and maps these processes to typical MANO and Agile processes.

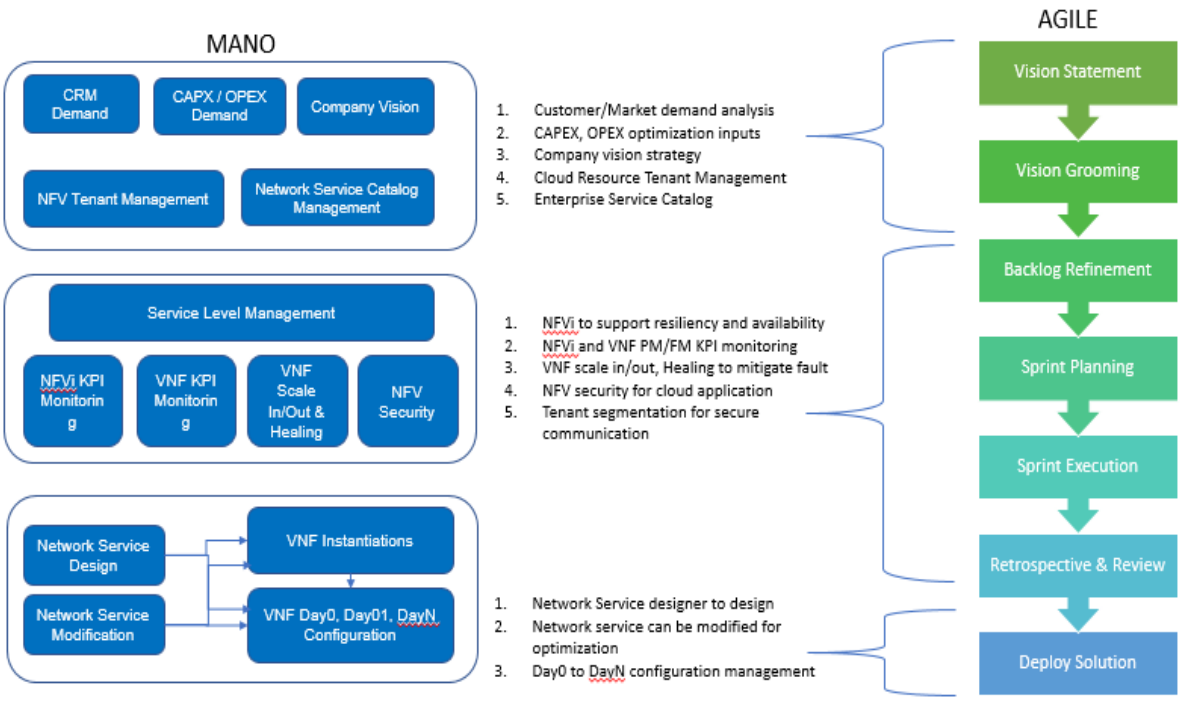

Figure 2: Integration of MANO to Agile

Whenever a new VNF is instantiated or created or when an existing VNF is reworked, the related MANO processes and relations involved are depicted in the left side of the figure above. These same processes are also mentioned in Figure 1.

- In the initiating process there are two possible starts. The first one maybe a business requirement to introduce a new service and is managed via the conventional CRM/Business RM process. The second one however can be a need-based decision based on requirements of scaling or a IT based decision from improvement perspective (e.g. to introduce routing. Firewalls etc). The service portfolio introduction management is the starting process and results in the service deployment of VNF, i.e., "a document that contains details of a new or changed service". Once the deployment is done it is sent to the next phase.
- Second phase talks more of instantiating the service and management of the life cycle of the service. It provides and manages the expected service level.
- VNF deployment is the last step. As a user one should follow all steps sequentially and move from one step to another only when the previous one is completed. A user may roll back or move to a previous step also in order to improve or to remake a previous output. However, reiteration of the above steps always lead to time delays and cost.

Agile Project Management Method introduction to MANO framework:

To make the MANO framework defined above in Fig 2 agile, the framework itself has to be adaptable to the agile manifesto. There are multiple approaches to associate the MANO framework defined above in this paper to Agile project management method. The different approaches are illustrated in the figure above marked as section a, b and c and explained below:

1. The services to be deployed must be created incrementally across the network along with VNF testing.

2. The instantiation framework should also have the capability to auto test and validate the VNF package and also modify it even when the implementation has already begun.
3. Both design and implementation for the VNF packages need to be done in parallel and the release of the packages need also to be at the same pace as the agile delivery or implementation is carried out.

Up to this point, this where the focus of Agile had been traditionally in any IT or Telecom industry. Within Telecom there are many instances and case studies which highlight the benefits associated with agile implementation in projects or programs along with statistics on gains achieved.

3. Conclusion

The MANO framework helps us with best practice solution for orchestration and management which is mostly designed for adoption of automation and cloud deployment solutions. As such, both values and principles of agile can be implemented in the way we deliver and manage deliveries within organizations and integrate it in the MANO to VNF deployment.(*Process Transformation – Challenges resolved using Agile integration with ITIL & eTOM*, n.d.)

An agile based approach enables faster delivery in MANO based services deployment, by focusing on agile principles for delivery of VNF services. This paper is a short overview of how agile can support orchestration in MANO; and not all answers are covered in the paper. Considering MANO and orchestration is still new and evolving, there is a lot of scope to improve upon the way deployment is happening today and to embrace Agile into MANO. (Almudarra & Qureshi, 2015)

Going agile way with orchestration creates a better approach to service delivery capability. It helps in delivering in short timelines and with better excellence and robustness.

4. References

12 Principles Behind The Agile Manifesto. (n.d.). Retrieved from agilealliance.org: https://www.agilealliance.org/agile101/12-principles-behind-the-agile-manifesto/

AgileAlliance. (n.d.). *Agile 101*. Retrieved from AgileAlliance: https://www.agilealliance.org/agile101/

Bertrand Verlaine, I. J. (2016). How Can ITIL and Agile Project Management Coexist? *ResearchGate* (p. 15). ResearchGate.

ETSI GS NFV-MAN 001 V1.1.1 (2014-12) 2. (n.d.). Retrieved from ETSI.ORG: https://www.etsi.org/deliver/etsi_gs\NFV-MAN\001_099\001\01.01.01_60\gs_NFV-MAN001v010101p.pdf

ETSI. (n.d.). *Open Source MANO*. Retrieved from ETSI.org: https://www.etsi.org/technologies/nfv/open-source-mano

Kent Beck, J. G. (n.d.). *Agile Manifesto*. Retrieved from agilemanifesto.org: https://agilemanifesto.org/

Vikas Sajjan, C. V. (2017). *NFV: Redefining Network Infrastructure.* Retrieved from Opensourceforu.com: https://opensourceforu.com/2017/09/nfv-redefining-network-infrastructure/

Wikipedia. (n.d.). *Orchestration*. Retrieved from wikipedia.org: https://en.wikipedia.org/wiki/Orchestration_(computing

Process Transformation – Challenges resolved using Agile integration with ITIL &eTOM. (n.d.).

Heavy Reading. (2014). *Driving Network Agility Through a Service Orchestration Approach Prepared by*. (April).

Borangiu, T., Drăgoicea, M., &Nóvoa, H. (2016). Exploring services science: 7th international conference, IESS 2016 Bucharest, Romania, May 25-27, 2016 proceedings. *Lecture Notes in Business Information Processing*, *247*(November 2017). https://doi.org/10.1007/978-3-319-32689-4

Almudarra, F., & Qureshi, B. (2015). Issues in adopting agile development principles for mobile cloud computing applications. *Procedia Computer Science*, *52*(1), 1133–1140. https://doi.org/10.1016/j.procs.2015.05.131

How does Agile apply to NFV and SDN. (n.d.).

Panda, A., Satapathy, S. M., &Rath, S. K. (2015). Empirical Validation of Neural Network Models for Agile Software Effort Estimation based on Story Points. *Procedia Computer Science*, *57*, 772–781. https://doi.org/10.1016/j.procs.2015.07.474

Dikert, K., Paasivaara, M., &Lassenius, C. (2016). Challenges and success factors for large-scale agile transformations: A systematic literature review. *Journal of Systems and Software*, *119*, 87–108. https://doi.org/10.1016/j.jss.2016.06.013

Younas, M., Ghani, I., Jawawi, D. N. A., & Khan, M. M. (2016). A Framework for Agile Development in Cloud Computing Environment. *Journal of Internet Computing and Services*, *17*(5), 67–74. https://doi.org/10.7472/jksii.2016.17.5.67

Lee, W., & Kim, H. (2017). Deployment Scenario and Architecture of MANO for NFV Network Services. *ICISS 2016 - 2016 International Conference on Information Science and Security*, 1–3. https://doi.org/10.1109/ICISSEC.2016.7885848

Park, R. C., & Weiner, J. M. (2002). Editorial: The gynecologic oncology group: An organization in transition. *Women's Oncology Review*, *2*(1), 1–2. Retrieved from http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L34467660

Lange, L., Blotny, A., &Magedanz, T. (2011). An agile service platform for telecommunication environments. *2011 4th IFIP International Conference on New Technologies, Mobility and Security, NTMS 2011 - Proceedings*, 1–6. https://doi.org/10.1109/NTMS.2011.5720648