Emergent Agile at Scale Adaptation Approach

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OVERVIEW
We must understand the complexities of making organizational transformations in order to provide services that may include not only training but mentoring and coaching that allows the Transformation Specialist within the organization to be more effective and ultimately more successful when attempting to produce a complex organizational change such as that which is involved in Agile at Scale transformation. We need to develop a comprehensive framework that attempts to cover all of the many aspects that need to be considered in order to produce the desired the Agile at Scale Transformation within an organization and avoid chaos. The proposed framework is based on a kind of Complex Adaptive Systems Theory called Emergent Meta-systems, which is related to Special Systems Theory as applied to organizations and teams. Meta-systems are the inverse dual of systems. It has been described by Meta-systems theory which is one schema that is the inverse dual of the System described by General Schemas Theory. We are describing an Emergent Meta-systems formation, which is one kind of meta-system. The Emergent Agile at Scale approach described here has eight basic elements and is divided into four overlapping quadrants. This theory is also based on an understanding of Emergent Pictures, Plans, and Models (that appear as open spaces or gaps in our Cyclical model) and how they fit into the synthesis of the Whole Form that is derived from their conjunction in a Supra-synthesis that is non-representable because it appears as a complex system at a higher dimensionality than our representations are able to capture. Repetition alone does not allow our representations to capture the Whole Form and thus we must appeal to a Supra-synthesis in order to be able to produce the Whole Form of the transformed organization that we aspire to producing through Agile at Scale transformation.

First Quadrant of the Cyclical Emergent Agile at Scale Adaptation Approach
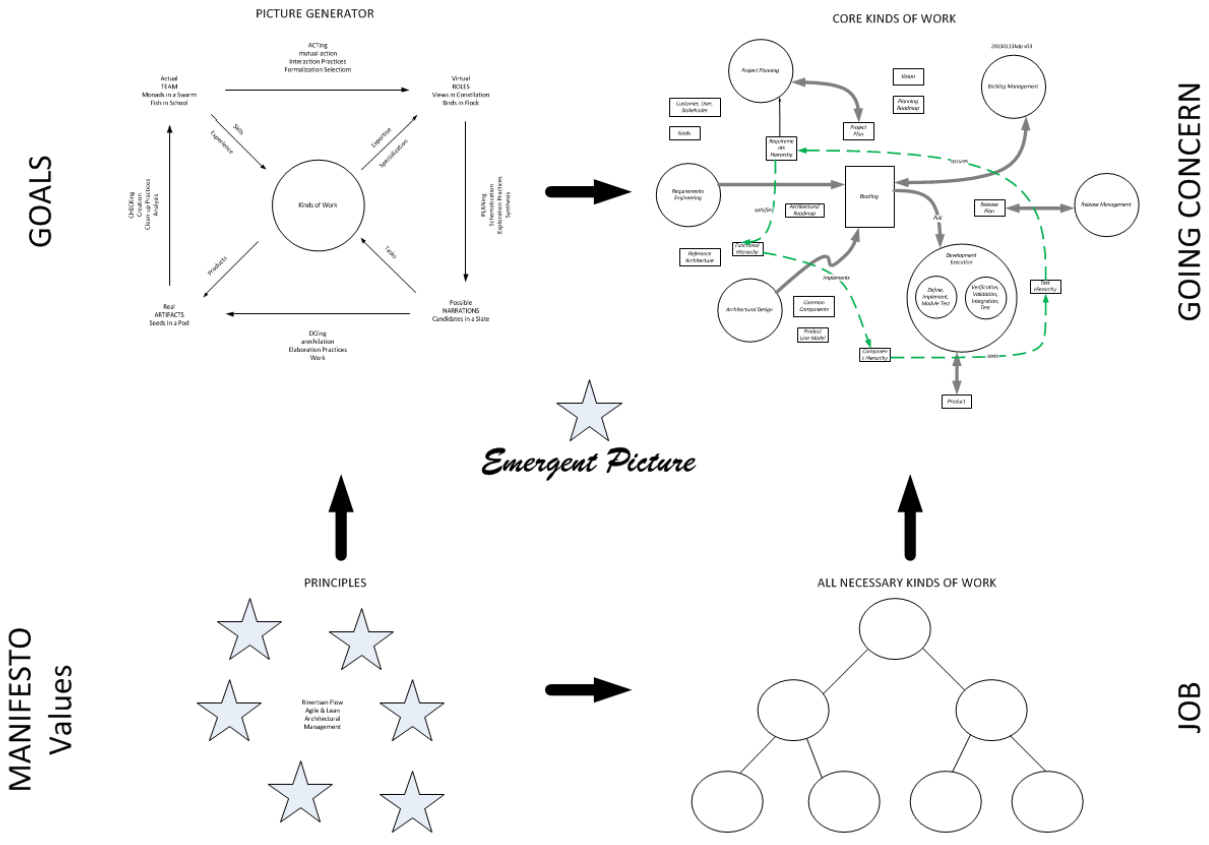
Quadrant 1

A picture of the end state goal is the first element of this model. In this case we are using the Leffingwell[1] Scaled Agile Framework (SAFe) as a reference because it is the market leader in this new space of Agile at Scale transformation models. However, in our model this can be replaced with a picture generator because many different pictures may be created of Agile utopian end states to serve different organizations. However, we recognize that the customer needs more than an end state vision in order to realize the transformation in actuality. There are more elements behind the scenes that are needed to reach that goal with reduced risk for the organization.

There is the question of the current lifecycle and process models of the organization and how those need to be changed in order to allow for Agile at Scale transformation to occur within a production environment. The clash between traditional expected processes and Agile and Lean practices can be severe and can produce cognitive dissonance in the production staff who are being held to conflicting standards. Alignment of processes and standards with Agile governance is an important part of changing from a Waterfall or Spiral type of development cycle to an Agile development cycle. Here we recommend taking a 'Kinds of Work' approach[2] to process description[3]. The kinds of work approach identifies all the kinds of work that is actually done at all levels of the organization and captures those in a time independent way and in a similar format. The articulating of generic kinds of work and the capture of the constraints on that work from outside based on the standards that the company has embraced allows a very flexible process infrastructure that can greatly facilitate the Agile transformation, and that is because

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[1] Leffingwell, Dean. Agile Software Requirements: Lean Requirements Practices for Teams, Programs, and the Enterprise. Upper Saddle River, NJ: Addison-Wesley, 2011.

[2] Jacobs, Jane. The Economy of Cities. New York: Random House, 1969.

[3] See http://flowprocess.info for previous briefings and articles that use this approach

the kinds of work do not change between the traditional control organizational style and the Agile and Lean style of organization that is being developed by the company during the transition. Rather, the company needs to identify the Policies and then the Requirements that flow from those policies. Then these requirements need to be levied on the kinds of work that need to adhere to either locally adopted or externally imposed standards. The kinds of work give a structural basis that is the same across different kinds of organizational structures and thus identifies those things that will be rearranged (but not changed) during the transformation. Some kinds of work will evaporate while other kinds of work will be discovered to be necessary during the transformation, but, for the most part, the necessary kinds of work that is needed to create the product will remain the same. Also, by identifying this structural substrate that allows for gradual structural changes within the organizational superstructure without affecting the primary work done within the organization there is always a baseline identified as to what is changing and what is remaining constant in the Agile at Scale Transformation.

There are ways to produce a simplified process model that clears away the encumbrance of the old Waterfall or Spiral type processes and prevents them from interfering with the transformation. This can be accomplished by identifying building blocks of the kinds of work that are done within the organization that are at a similar level of abstraction such as Design, Requirements, Configuration Management, Documentation, Implementation, Verification, and Validation as well as describing them briefly in a similar way by specifying the requirements that need to be met and associated procedures when they are necessary. Agile and Lean approaches will change *how* this work is done in practice although the work that is necessary for the product to be produced will essentially remain the same due to the nature of the software. The practices necessary in software engineering will be rendered more effective and efficient by recognizing human limitations and team strengths and by removing unnecessary structures that do not contribute direct value.

It is, however, also necessary to understand more than just how kinds of work processes that do not incorporate time can be used to constrain Agile and Lean practices to radically simplify written processes needed for coordination throughout the organization in order to set expectations. It is necessary to understand that Agile work management frameworks (like Scrum) depend on a completely different way of working that emphasizes teams and their self-organization. Thus, what is necessary is an Agile Theory[4] based on Complex Adaptive Systems (CAS) Theory, and this has been provided by an in-depth comparison between Agile and Lean approaches and Special Systems Theory. But also we need to understand The Foundations of Agile Teaming[5] as well and that has been explored by the author in terms of the relationship of Scrum to High Performance Teams based on the model given by Reflexive Social Special Systems Theory in particular. When we make this comparison to a specific and unique CAS model rather than a general model such as that introduced by Holland in The Hidden Order[6] then we find that the drivers of Agile and Lean transformation are completely different from anything confronted previously in Organizational Change. In a sense, what is necessary is a transformation that produces the inverse dual of the Organizational System as we begin to think of it as a Meta-system (Openscape) as it is described in General Schemas Theory. The deeper model of transformation here is based on this deeper theory of Agile and Teaming and its relation to Meta-systems Theory. Another important element in this transformational model presented here are the Principles that are derived from the values in the Agile Manifesto, as well as other principles such as those in Rinertsen's Flow, which are related to second generation Lean approaches that stand behind the Leffingwell model. But there are other principles that need to be understood and acted upon that are related to Agile and Lean architecture, Agile and Lean management, and other sources that provide the guiding threads that will transform how we do the kinds of work that are necessary to produce products using Software and Systems Engineering. Principles are

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[4] http://agiletheory.com

[5] http://agiletheory.com

[6] Holland, John H. Hidden Order: How Adaptation Builds Complexity. Reading, Mass: Addison-Wesley, 1995.

not abstractions. They are like beacons that guide Practice below the level of abstract universal ideals. The Leffingwell SAFe big picture is an ideal organizational structure that implements Rinertsen's Flow principles. Thus, those Flow process principles can be expressed in many forms; Leffingwell has produced a big picture of the Agile at Scale transformed organization as an endpoint state that allows us to get an idea of the kind of goal that we are attempting to attain by our Agile at Scale transformation. But, in fact, we could take those principles (Rinertsen's ideas) and produce many different big picture visions adapted to specific organizational cultures. This is a good thing because this means that starting with Rinertsen we can produce adaptations of Leffingwell that are more adapted to the adopting organization rather than a single 'one size fits all' point solution that the SAFe big picture represents. No matter how good the abstract point solution may be that presents organizational structures that will allow Agile and Lean to flourish, the principles are more flexible than any given structural solution.
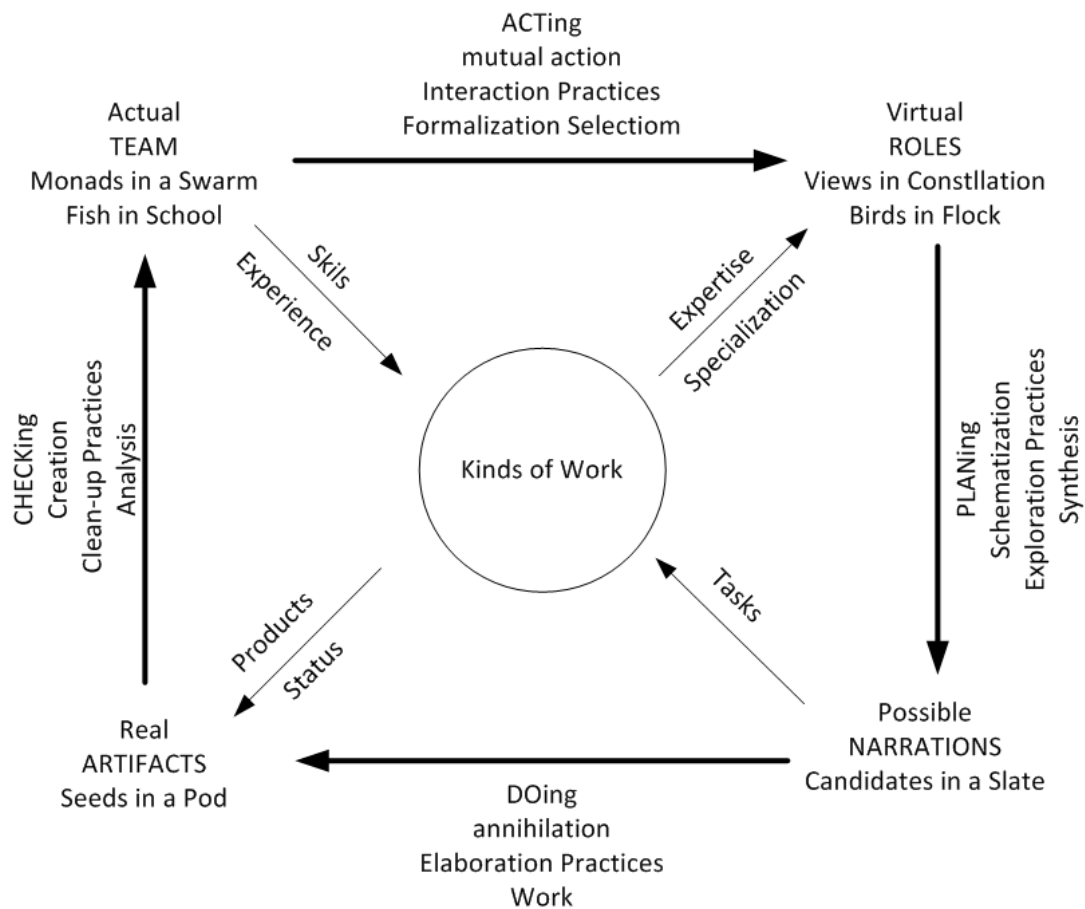
Picture Generating Emergent Meta-system

Thus, the approach taken here is to replace the Leffingwell point solution with a picture generator based on the Emergent Meta-system model, which is part of the Special Systems Theory. When we look at the SAFe Big picture we notice that the key elements are the teams, roles, narrations, and artifacts that appear in the big picture. We can take these elements and produce a version of the Emergent Meta-system that can generate different pictures (of which SAFe is only one single point solution) by concentrating on the structural elements that make up SAFe rather than focusing on its specific configuration. When we make this alignment between the Emergent Meta-system as a mathematical template and the elements of SAFe then we can think of Teaming as the basis for actualization, and as a result, mutual team action and

cooperation, as well as practices and self-organizing and self-directing interaction. Teams contribute skills and experience to make it possible to execute the kinds of work necessary to produce the product. The team is cross-functional and there are many roles on a team that are shared and also helped by the special roles of the Product Owner and Scrum Master. Based on the roles there is specialization and expertise that are made available within the team and on the basis of those qualities. Planning occurs along with the exploration of options for architectural designs and the use of various technologies. This is the operation of schematization that produces the possibilities for how the work can actually be accomplished. These possible ways of doing the work in order to add the features that are desired and organized by the Product Owner provide a series of narrative syntheses termed Epics, Features, or Stories that appear in the Product Backlog. These are broken into takes by the team to produce their Sprint Backlog. These stories refer to the kinds of work by implication. Work then proceeds as the backlog of tasks that are done by the team in the order that they choose to do them. This is the Doing portion of the loop where practices are applied that implement the kinds of work and the product artifacts that are elaborated. This work results in artifacts, the most valued of which is *working software*. But, there are also other associated artifacts that are needed for others to be able to understand and use that software. Working Software (potentially shippable increment) is designated as the real 'end product' of the Scrum process that is reviewed at the end of the Sprint. The Product owner has the job of checking the potentially shippable increments of the product, reporting to the team which ones he considers done, and having satisfied the definition of done and the acceptance criteria. The artifacts are the product of the kinds of work considered as timeless functions that are done in time through the application of practices by the team that address the tasks taken on by the team in the Sprint. When we apply this Emergent Meta-system model to the work of the team then we are able to see that behind the SAFe big picture there is the same dynamic that is operating in every Scrum team no matter what level of abstraction they are dealing with in respect to the products being produced, whether at Portfolio, Product, or Team levels. The SAFe big picture applies Scrum teams at every level of the organization, and, in fact, the organization becomes a meta-system providing the niches for these Scrum team systems at various levels of abstraction.
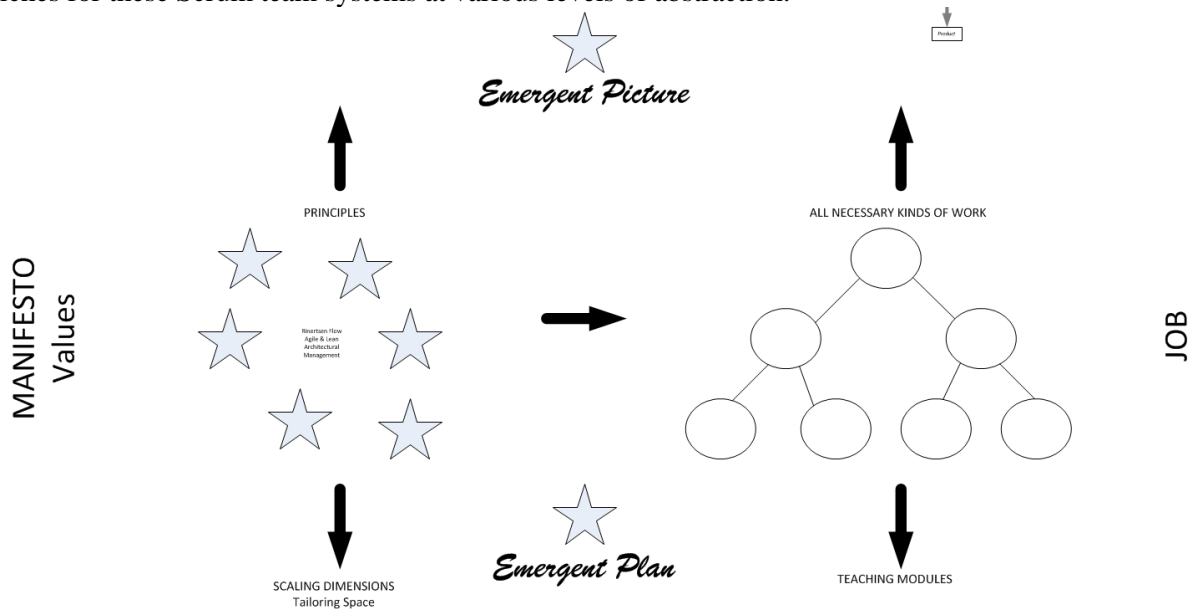
Infrastructural Layer 2

Thus, we have identified two structural bases for our Agile at Scale transformation. One of these is the Agile and Lean principles although there are other principles that we wish to use to guide our activities in the future because they are more effective and efficient, which is to say more efficacious than the way we do things within the 'top down' control structures of traditional organizations. Because Agile and Lean approaches are more effective and efficient we have decided to devolve control to some degree downward within the organization so that we can be more resilient and adaptive in our production process and more

responsive to the needs of customers and more sensitive to changes in the environment of the production process. To that end we have also described the kinds of work that we do in a functional decomposition that allows us to identify the timeless structural components of our work, which will allow us to re-aggregate and reorganize that work without losing sight of the essential things we have to do to continue to produce products. We noted that if we applied the Emergent Meta-system as a picture generator rather than having a specific picture such as SAFe then we could see how the kinds of work are incorporated by the team, their roles (such as the Scrum roles), the narratives (that yield tasks performed by the team), and the artifacts that are produced by the team. We have thus established a twofold basis for the structural transformation of the organization by capturing what kinds of work must continue to be done within the new organization and the principles that guide the work that is done. We recognize that Leffingwell's vision is just one possible image of the goal toward successful transformation and that there are many possible structures that can achieve the same goals. The Leffingwell model is simply one good example that allows us to coordinate our activities in the transformation, and we can adapt that model based on the exigencies of our particular company as long as we satisfy the Second Generation Lean and the Agile Principles as applied to the kinds of work that must be done by unleashing the power of high performance teaming. By using this expanded model of Agile Transformation we will then have a strong structural infrastructure for implementing those changes.
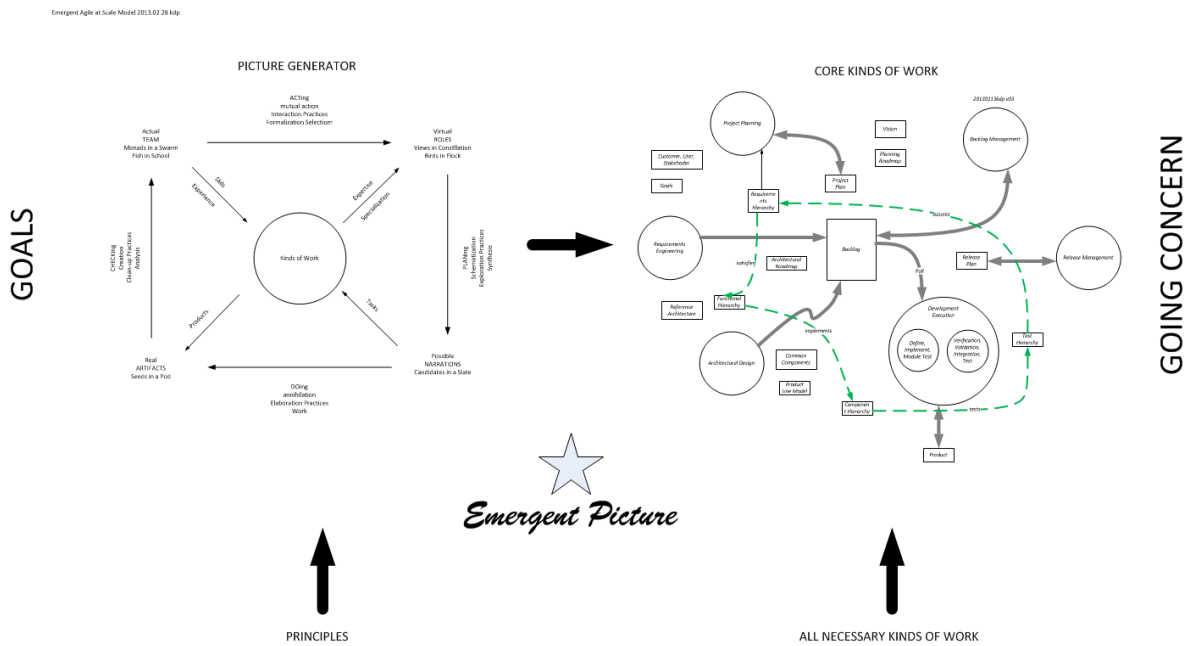
Superstructural Layer 1

An additional benefit from doing the Kinds of Work analysis is the realization that it is possible to do the core of the Leffingwell SAFe model with only *six* kinds of work. These six are: Requirements Engineering, Architectural Design, Planning, Backlog Management, Release Management, and Development, which is a 'catch all' for the 75 to 150 other possible kinds of work that are needed to produce a product. There are many kinds of work that are not performed by Agile production teams that are absolutely necessary to deliver the end product. Part of scaling agile is to bring the Agile and Lean principles to bear on these other kinds of work as well. But we can achieve an immense simplification of the Leffingwell big picture by realizing that it really only involves six core kinds of work and that those are the same at whatever level that we use them within the Leffingwell picture, i.e., the Portfolio, Product, and Team levels. Of course, there are differences of artifacts generated or differences in the context of these kinds of work, but essentially, by training how to do these core kinds of work the entire Leffingwell framework can be vastly simplified into its core elements that are then differentiated at the various levels of abstraction that he identifies. Thus, we may produce a composite normal dataflow model of the

Leffingwell model, and then differentiate that into separate flows at each level that encapsulates the differences that occur at the various levels of abstraction. Having that dataflow model makes the Leffingwell approach easier to understand and to implement as well as tailor because, when understood via kinds of work, it is easier for people to understand what is necessary to be done to affect the implementation of the Leffingwell model. These six kinds of work are what is needed to produce the backlogs at whatever level of abstraction we are creating them. In addition to this explanation of the kinds of work necessary to produce and maintain the backlogs, we will present an expansion of the concept of Product Backlogs based on the work of Roman Pichler[7] concerning multidimensional backlogs[8] in order to obtain a more robust picture of what must actually happen to get inter-level coordination between backlogs.

When viewing these four elements as a quadrate (at the first level of our Goals) take notice that doing the Agile at Scale Transformation causes us to invoke a utopian vision of the end state that Leffingwell proposes, but we can simplify that into a process model based on the kinds of work that is represented as a dataflow that allows the various levels to understand their work in the same manner and thus increase coordination between the teams at the various levels. This is made possible by identifying the kinds of work that must be done to produce software systems engineered products. However, that work is now guided by new principles that have their root in the Agile Manifesto and other sources that have been determined to be more effective and efficient such as the principles of Rinertsen Flow[9] as well as those that are applied to the kinds of work. But, in addition, we now have a specific Agile Theory and a theory of High Performance Teaming that guides our implementation of Scrum at all the levels of abstraction within the SAFe model, which thus makes it easier to explain why we are applying the practices that we are using. For the most part this work is organized using six core kinds of work that implement the Leffingwell vision of the organizational coordination between levels of abstraction. All the other kinds of work, between 70 and 150 different functionally differentiated kinds of work are described in narratives that are placed in backlogs at various levels of abstraction in the Leffingwell picture. Thus, narratives (themes, epics, features, and stories) call on kinds of work to be done to produce a synthesis that is necessary for producing products while all the other kinds of work are organized by the six core kinds of work via the narratives and tasks that determine how work is to flow through the levels of abstraction in the various backlogs in the organization. Narratives are syntheses and they imply tasks that will be necessary to bring about these syntheses and those tasks implicitly call upon the kinds of work as they are done based on specific technical practices. Of course, narratives at any level result in tasks. It is the tasks that are specific to a given team at any particular level of abstraction. Tasks are embodiments of mixtures of kinds of work and they are where the actual work is done in a given team. *So, we may say in this case, with this particular first quadrant of elements, that the **principles** create the conditions for the production structure to separate into levels of abstraction and the roles of the Lean organization, then the **Kinds of work** are performed based on the Agile, Lean, and Flow principles when they are called from a backlog based on a narrative*. The narrative flow that moves through the R&D organization from Portfolio, to Product, to Team levels is made possible by the application of just six kinds of work that are applied by the Scrum teams at each level of abstraction as the way of organizing the work within the backlogs from a process perspective. The Leffingwell picture can be simplified into understanding these six kinds of work and their interactions around the multi-dimensional backlog. Leffinwell's picture does not deal with the other kinds of work that are necessary to be done by those who are in Scrum teams or other resources within the organization that act as a meta-system for the Scrum teams at the various levels of abstraction. Backlogs contain narratives (Epic, Feature, Story) and these result in tasks that invoke mixtures of the

[7] Pichler, Roman. Agile Product Management with Scrum: Creating Products That Customers Love. Upper Saddle River, NJ: Addison-Wesley, 2010.

[8] http://www.romanpichler.com/blog/

[9] Reinertsen, Donald G. The Principles of Product Development Flow: Second Generation Lean Product Development. Redondo Beach, Calif: Celeritas, 2009.

kinds of work. The kinds of work provide a reference for how the work should be done generally and also give the external or internal constraints on that work to assure quality, safety, and other constraints on the exercise of a given kind of work so that control is not lost over the work simply because we have switched into an Agile regime. Many of these kinds of work that need to be considered are what may be recognized as process areas in the CMMI model from the Software Engineering Institute. However, even the CMMI process areas do not specify all the technical kinds of work that need to be done to produce complex software and other types of technically sophisticated products.

When we look at this first quadrant of elements carefully we see that the conditioning intentionality goes from Manifesto to the structural picture of inter-level coordination pictured by Leffingwell, which is a response to goals set by the organization as well as the kinds of work that are necessary to produce products. Note that the kinds of work necessary for production can be split into core work, which are what is necessary to control the workflow between levels of abstraction, and development work, which is everything else that needs to be done to produce the product and becomes referenced in narratives and tasks that appear in the backlog. The key change that is introduced is that almost all work (other than the six core kinds of work flow through the backlogs as well as what the interconnected backlogs allow) is for the rest of the organization to keep up with the accelerated cadence of the production teams implementing Agile practices. The sustainment of cadence and keeping input backlogs of production teams full so that they can maintain their delivery of value (in products) is the key to the whole revolution that we call Agile at Scale transformation. *Control Organizations cannot keep up with the speed of Agile teams in producing definitions of products to be produced. By making an Agile at Scale transformation the organization itself establishes its own cadence that aligns with the cadence of the production teams to get maximum effectiveness and efficiency sustained over time, which gives an organization a definite market advantage over competitors.* The extent to which these rewards will be garnered is predicated on making the control organization based on Waterfall or Spiral models of development as closely aligned with the Agile and Lean principles as possible. To the extent that the organization remains a hybrid, then fewer rewards in terms of efficiency and effectiveness are likely to be garnered from the Agile at Scale transformation. In fact, a failed transformation may result in chaos in an organization. It is possible to make what *appears* to be an Agile at Scale transformation without getting anything in terms of increased effectiveness and efficiency, if we merely continue traditional command and control approaches under new names. It is also possible for an organization to enter uncontrolled chaotic states if a 'big bang' approach to Agile at Scale transformation is attempted without sufficient forethought and planning and the identification of the structural infrastructure that will support that change. What we recommend is a thoroughly thought through approach that is not just Agile in Name *only,* but rather an approach that attempts to use Adaptive Complex Systems Theory as the guiding Agile theory, which allows us to discern what is Agile and what is not, and to assess the impact of remnant control structures and traditional Waterfall or Spiral practices that will constrain and impede the improvement of effectivity and efficiency. Each organization must make its own tradeoff between the amount of fundamental transformation that it is willing to endure at any given time, and it is suggested that the organization evolve into its Agile at Scale implementation using gradual structural change. However, it is important to root all change activity in as pure an implementation of Agile and Lean principles as possible to get the maximum benefit at each stage that the organization can tolerate without going into chaos. Notice that Chaos is entered by a series of bifurcations of state and the first bifurcation is between Agile and control organizational practices within the same company. If Agile states on different teams proliferate, and if control structures attempt to get back under the control of the self-organization of teams also proliferate, then eventually a chaotic state will occur. But, this is ameliorated by having a good foundation in the principles and kinds of work that are the underlying structural infrastructure to the changes that are being made in the organization that make the work visible and flow through backlogs at different levels of abstraction. Narratives flowing through the backlog and being decomposed into more and more granular synthetic epics, features, and stories are then implemented by tasks that include mixtures of different kinds of work. When this work is performed in accordance with the principles that have been elucidated

related to Agile and Lean via Scrum there is a constant reference point for the guidance of how the work is to be performed. The superstructure that implements these flows of work may be adapted to the organization gradually over time. The effort that it takes to organize this work remains constant and is defined as the six core kinds of work that are necessary to implement the multi-dimensional backlogs and their interconnection for the self-organizing teams at each level within the big picture of the Agile at Scale organization that is the utopian vision guiding the transformation.

But, there is a key point. In the middle of these four elements there is an open space and we identify that gap with the Emergent Picture of the Agile at Scale organization that is specific to the transforming organization, not the ideal model. The point is that no ideal formulation will capture all the complexity of what needs to be done in a particular organization to achieve its transformation, and each organization will need to adapt the ideal model presented by Leffingwell to their own needs and peculiarities, as well as other goals that they may have beyond the Agile at Scale transformation itself. Thus, the suggested approach is to work with the customer to refine their concept of the 'best end state' for them and the 'waypoints' along that road that their organization is willing to embark upon and can tolerate. That Emergent Picture of the end state and the way to that end state is a teleonomic process[10], i.e., it is not teleological, i.e., not predetermined and not captured by the ideal picture presented by Leffingwell, but discovered as we explore how the principles guide the kinds of work that need to be done within a structure of abstract levels and workflow that makes sense given the company's history, sophistication, and inertia with respect to leaving the seeming safety of the control organization and Waterfall or Spiral development lifecycles into the unknown and uncharted waters of increasing their own agility and making themselves as lean as possible, and increasing the flow of value within their organization.

Second Overlapping Quadrant

Quadrant 2

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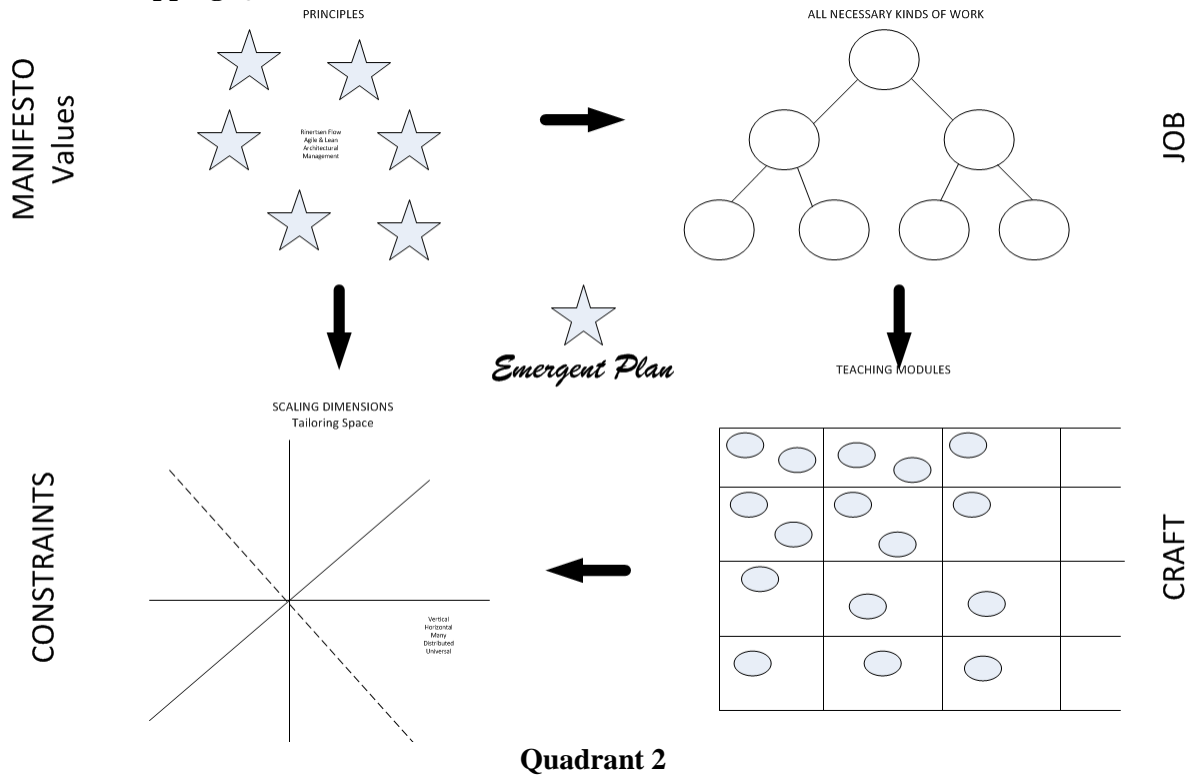
[10] Monod, Jacques. Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology. New York: Knopf, 1971.

Now we move on to the second Quadrant which overlaps the first but adds to the Principles and the Kinds of work as the structural underpinning of the transformational idea of scaling. There are many dimensions to scaling and this provides a tailoring space within each organization that needs to find its optimal balance of forces that it operates on at the various levels of abstraction, which are called out by the big picture. These dimensions include the size of the organization to be transformed and the various vertical layers of command and control within that organization that need to be dealt with. There is also a functional dimension which has to do with how many different functions or divisions of the company that are included in the transformation. There is also a dimension, which has to do with the variety that is tolerated in the company as to the different kinds of tools and methods that are used and the number of smaller projects that the company has, perhaps in different markets. Another dimension is the level of distribution of the company's development resources and whether these teams are collocated or interfacing virtually. This includes factors such as the cultural diversity of the teams as well. And then there are some crosscutting concerns that affect every dimension. These various dimensions[11] represent the tailoring space that constrain the forces that are affecting the structuring of a solution to the scaling problems for a given organization. The characteristics of these dimensions influence the horizon of the problematic of producing Agile at Scale solutions as well. This particular solution will be tested against the acceptance criteria that are associated with these various dimensions. And this solution will compete with other solutions that are possible on conceptually different grounds that may be offered to provide Agile at Scale solutions for companies. One group of theorists[12] recommends *not* scaling, but this is tantamount to saying *don't grow*, and normally, in corporations, growth is a primary factor in their success as seen by the market. But, if you have to scale, then it is best to be cautious as to how you go about it, and the approach of gradual structured transformation offers guidance in how a particular company should scale and find solutions that best fits their place in the design dimensions of scalability.

Layer 3
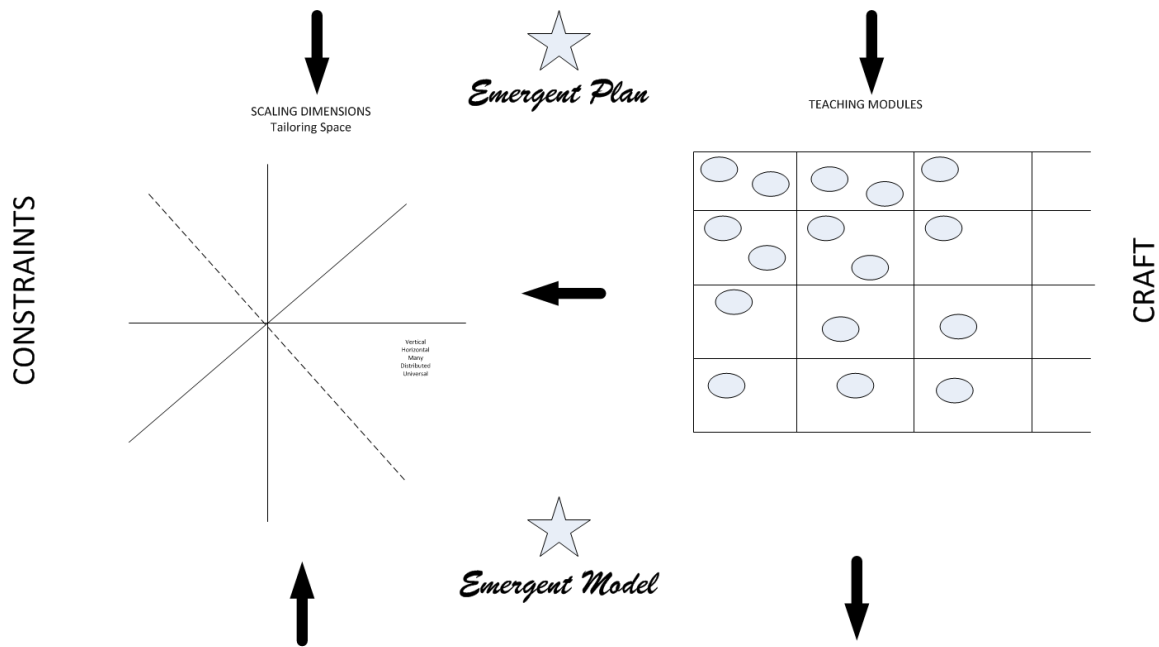
In this suggested approach we would offer a series of trainable practices that apply at the various scales in the categories of technical, workflow, organizational, and social practices[13]. These training modules allow

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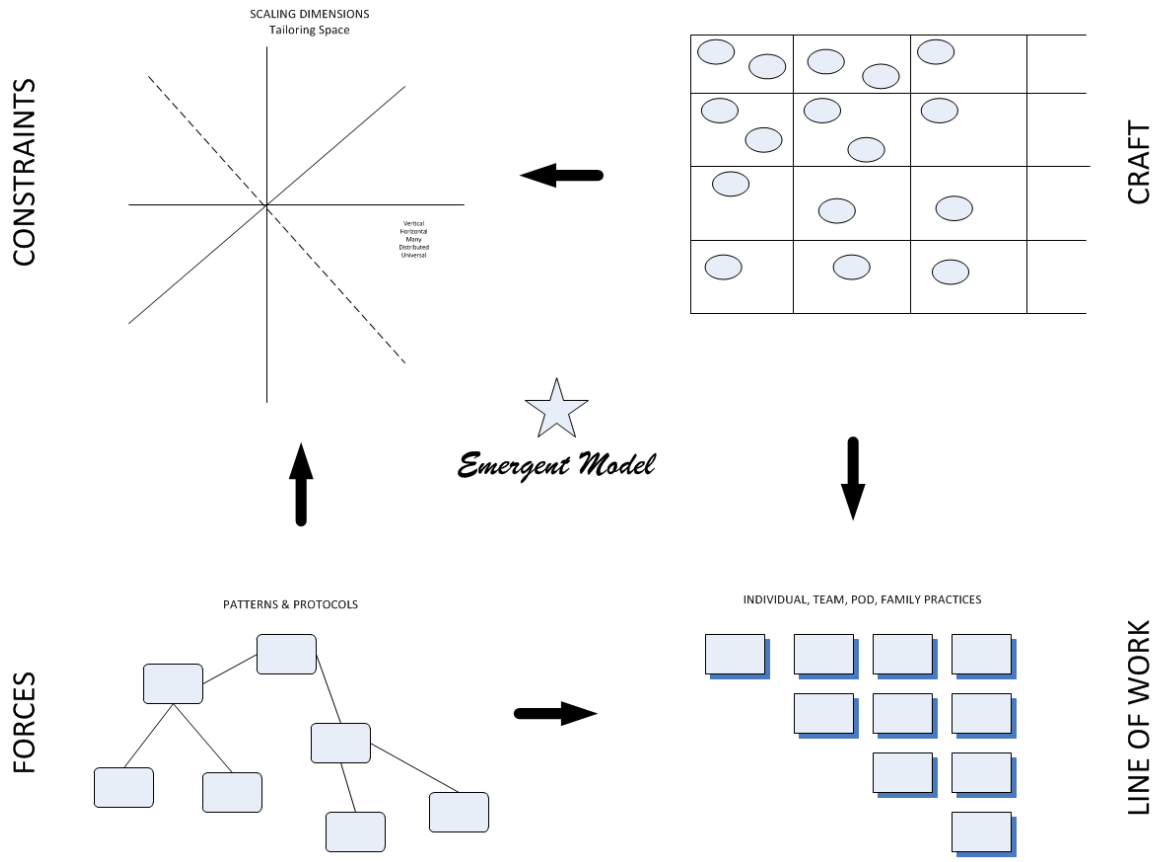[11] Suggested by Charlie Rudd from SolutionsIQ as being significant
[12] Larman, Craig, and Bas Vodde. Scaling Lean & Agile Development: Thinking and Organizational Tools for Large-Scale Scrum. Upper Saddle River, NJ: Addison-Wesley, 2009.
[13] These categories were suggested by Paul Dupuy of SolutionsIQ

the participants in Agile at Scale transformation to learn new skills and to develop their craftsmanship in ways that are known to affect productivity and increase effectiveness and efficiency over traditional methods. The dimensions of scalability and the trainable practices give a way to formulate the solution for a particular company's Agile at Scale transformation program, as well as the option to choose from the skills that they would like their employees to gain. This allows change to be learned in a progressive manner and then implemented with the help of mentors and coaches both at the development level and at higher levels of abstraction. Our emphasis is on the protocols of high performance teams and our concept is that if the teams become autonomous, self-organized, and self-directed, then they can pull from the trainable practices as they need them and at their own absorption rate. This will produce a much more natural way for teams to take control of their own learning and development with respect to Scrum and other Agile and Lean practices, rather than it being decided for them by an outside entity as to how they need to be trained and in what way.

But there is also an open space (or gap or empty spot) in this new overlapping second quadrant which we see as the Emergent Plan by which the High Performing team draws on the skills it needs to become high performing and then draws on the training necessary for it to adapt itself to the Agile and Lean practices at its own level of abstraction within the Leffingwell model. The high performing team takes control of its own destiny and adopts at its own pace the various trainable practices that are necessary for it to improve at a rate it can absorb. The Agile and Lean trainable practices that increase skills and enhance craftsmanship are ways of doing the kinds of work that have been identified in concert with the principles that have been adopted flowing out of the Agile Manifesto. The team determines its place within the solution space chosen by the organization based on the dimensions of scaling that belong to it. The team determines or pulls the training, mentoring, and coaching that it needs to achieve its own goals. Out of that comes an Emergent Plan developed by the team based on its own self-organization within its own environment and that expresses its self-directed purpose within its organizational context. Balancing the self-organizing capacity of teams and team autonomy and self-direction with necessary minimal controls to make the organization function is a delicate and hard to achieve balance between these competing divergent and convergent forces that come into play when an organization begins to undergo Agile at Scale transformation. There may be multiple Emergent Plans for the various teams and multiple cooperating teams for the organization as a whole, these are associated with the vision and the roadmaps of the various teams at different levels of abstraction.

Third Overlapping Quadrant

SCALING DIMENSIONS
Tailoring Space

CONSTRAINTS

Vertical
Horizontal
Many
Distributed
Universal

CRAFT

Emergent Model

PATTERNS & PROTOCOLS

INDIVIDUAL, TEAM, POD, FAMILY PRACTICES

FORCES

LINE OF WORK

Quadrant 3

The next quadrant extends the scaling dimensions as a solution for a design landscape for a given organization and the trainable practices at the various levels of scale. Also included are Patterns, on the one hand, driven by forces, and Practices that are owned by individuals, pairs, triads[14], teams, coordination groups, and sets of teams that must synchronize on large projects. Ivar Jacobson in the SEMAT.com group has attempted to define the relationship between process and practice as expressed in the article "Enough Process, Let's do Practices"[15]. This article expresses one of the key features of the suggested approach to concrete implementation within the scaling solution space. In effect, there are many different organizational patterns and protocols such as those discussed by McCarthey[16] and Coplien[17] for how to organize concretely to accomplish goals at the 'on the ground level' where actual work is done at whatever the level of abstraction. We pick protocols and patterns that enable high performing teams, although teams can pick their own patterns and protocols to follow as a basis for their self-organization and these result in specific practices developed by the team that will be specific to their context with their own artifacts as either intermediate or final outputs of the team production work processes. These spontaneously fabricated practices at the various levels are influenced hopefully by the taught Agile and Lean practices, but they may be emergent responses to a particular situation within

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[14] See Mezick, Daniel. The Culture Game: Tools for the Agile Manager. North Haven, Conn.: New Technology Solutions, Inc, 2012.

[15] "Enough of Processes - Lets do Practices" by Ivar Jacobson, Pan Wei Ng and Ian Spence in Journal Of Object Technology; Online at http://www.jot.fm. Published by ETH Zurich, 2007 Vol. 6, No. 6, July-August 2007

[16] McCarthy, Jim, and Michele McCarthy. Software for Your Head: Core Protocols for Creating and Maintaining Shared Vision. Boston, MA: Addison-Wesley, 2002.

[17] Coplien, James O, and Neil Harrison. Organizational Patterns of Agile Software Development. Upper Saddle River, NJ: Pearson Prentice Hall, 2005.

which the team finds itself related to a particular technological infrastructure and a specific stage in development of a particular product. Patterns, on the one hand, inform the solutions within the scaling dimensional space and the concrete practices of the team that they invent for themselves. But, on the other hand, the trained practices from the catalog of offerings by an Agile training and coaching vendor may also inform both the solution space within the dimensions of scaling and the individual practices.
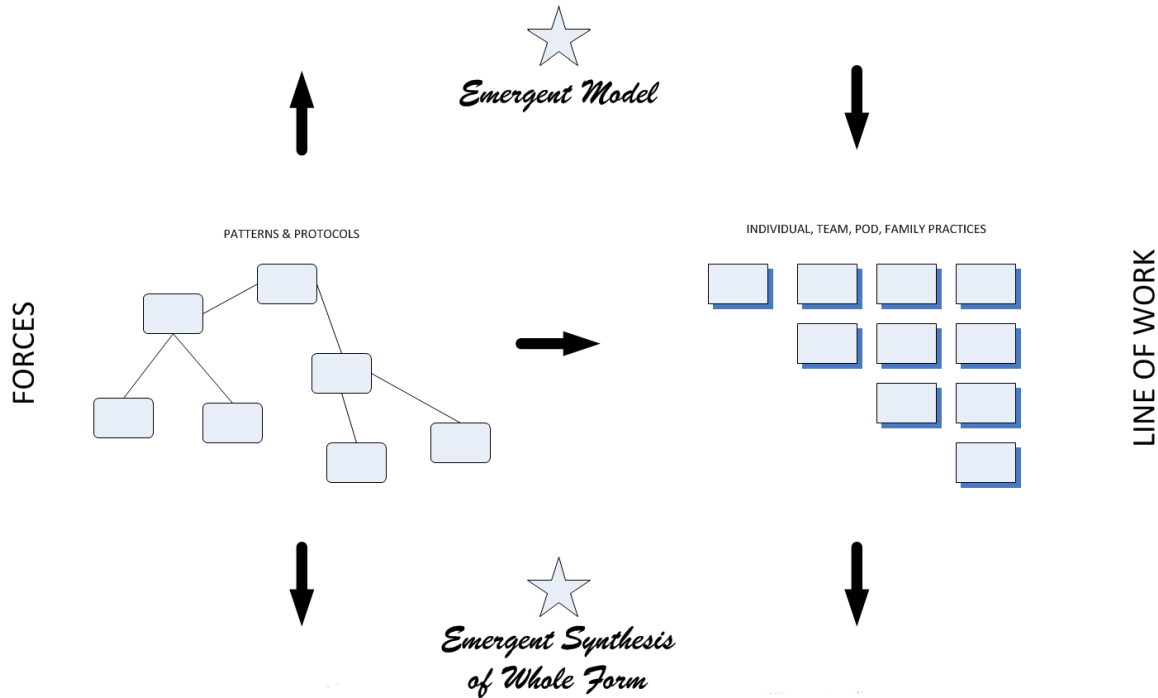
Layer 4

Between these four elements there is another gap opened up in which an Emergent Model of a concrete organizational solution is created at a given level of abstraction for a particular team. This model embodies the Emergent Plans that were laid down in the last quadrant of this model. Here, we can see a specific concrete Emergent Picture of how the organization will adopt Agile and Lean practices that inform Emergent Plans of the teams within the organization as they form at various levels of abstraction. These are then modeled in practices that they create to coordinate communication or agreement within the team or between teams, or between teams and the organization as a meta-system (openscape) that *contains* the teams, which are not within a team. In an Agile at Scale organization ideally everyone should be eventually in a team with their own backlog. But, of course, that grows over time as the organization gains more experience with Agile and Lean and seeks higher levels of effectiveness and efficiency, i.e., efficaciousness.

Fourth Overlapping Quadrant

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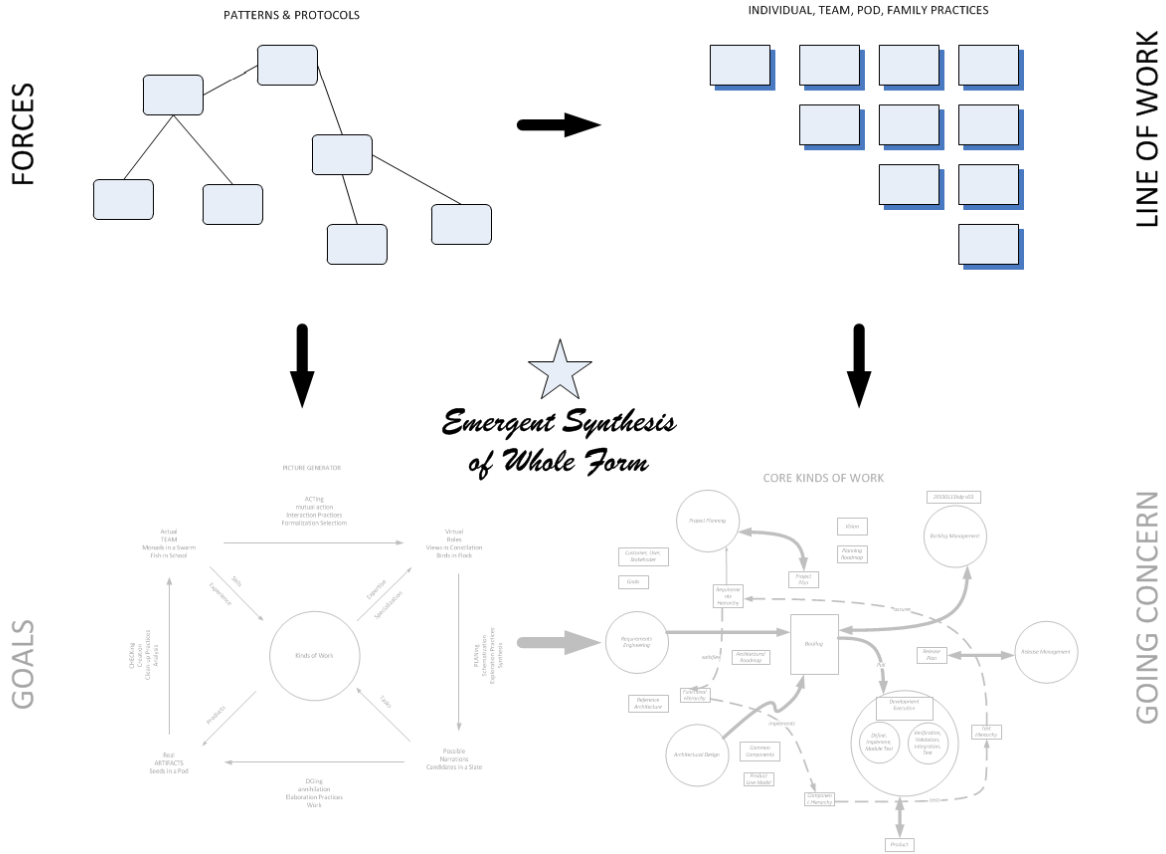
Now, what is interesting is that there is one final overlapping quadrant that needs to be discussed and with this quadrant we loop the loop and connect the beginning quadrant to the last one. In that case the elements are given. On the one hand there is the SAFe big picture of Leffingwell or whatever utopian ideal that the company seeks to implement with their Agile at Scale transformation and there is the simplification of that when viewed as the kinds of work that center around a multidimensional backlog, but on the other hand, there are the Patterns and Protocols through which the organization produces *structure* for itself including the ones that they invent. There are also the owned concrete practices that the teams create as ways of communicating internally between themselves and with each other. On the one hand, Practices are called by processes and those processes are called by tasks that implement narratives (epics, features, stories) in the backlogs except for the core processes that are needed to manage the backlog. On the other hand, there is the big picture of roles and how the backlogs are connected as work flows down within the organization and is implemented using many different organizational patterns. This creates another gap between these four elements, which we can identify with the Emergent Whole Form of the organization concretely embodied as a synthetic whole. Core processes manage backlogs that are interconnected and through which stories flow, which again refer to processes as kinds of work in mixture from tasks that in turn invoke practices. But, on the other hand, the big picture only invokes a small slice of what is needed for an organization to be functional, which is described best by organizational patterns that are embodied in practice that inform the big picture when it has achieved a stable state after the transformation.

An Emergent Overlapping Cyclical Emergent Agile at Scale Adaptation Model

So, this series of elements forms a dual band that comes round and meets itself forming a cycle we can picture as a cycle of four pairs of elements. Each element is paired with another element in the band. This produces an overlapping set of quadrants of four elements each. Each new quadrant overlaps with the

previous quadrant by sharing two of its elements. And between any four elements is an open space, gap or hole that indicates the non-representable aspect of the task ahead for an organization attempting to operate in an Agile and Lean at Scale way. Thus, we have four of these gaps, which have been called the Emergent Picture, the Emergent Plan, the Emergent Model, and finally the Emergent Whole Form of the experimental Agile at Scale organizational tailoring template. It turns out that this set of elements is like the tools that architects use to design a building. Architects use pictures, plans, and models to present a picture of what they are designing for their customers. But those pictures, plans, and models are different from the completed synthesis of the whole building. In fact, it is not possible to add up the pictures, plans, and models to get the whole form as a complete synthesis, instead, building contractors must be hired to produce the new structure (or the renovations of an old structure on sight) guided by the pictures, plans, and models produced by the designer. In this case, we are not building an edifice, but instead we are building an organization that is leaner and more agile and hopefully also more resilient and adaptive. In fact, as has been made clear elsewhere[18], it is only possible to get the Emergent Whole Form from a Supra-synthesis at a higher dimensionality from the synthesis of the Whole Form at a given level. And interestingly that super-synthesis is made up of the Whole Form in conjunction with the Emergent Picture, Emergent Plan, and Emergent Model. The Emergent Whole Form can be extracted from the non-representational super-synthesis but cannot be built up by repetition from representations at the level of the picture, plan, and model. What we are building is a new way of working together amongst ourselves. We are starting with a traditional control oriented structure and attempting to mix collaboration and competency to get to an organization that spontaneously cultivates Agile and Lean ways of doing things as well as developing craftsmanship to improve both product and process through Agile and Lean practices.

It is one thing to collaboratively design the Agile at Scale organization and another thing to collaboratively realize it in our behavior toward each other as we participate in self-organizing and eventually self-directing high performance teams. We are in the midst of one organizational structure based on command and control from the top down that fosters an illusion due to Ashby's laws that it is possible to know what is going on everywhere and control it and manage it from the top of the organization. We are in the midst of transforming this hierarchy into a network of teams who manage themselves and their own work and their coordination with other teams within the organizational environment. The organization ceases to be a seen as a system and instead becomes an operating environment (meta-system, openscape) for teams and individuals through which we need to learn how to navigate and swim in schools like fish or wing through the air in flocks like birds. In other words, we are leaving the individualized culture and entering a team based culture inherited from the Japanese who have shown that it is more efficient to empower teams internally than to try to control them externally. Rinertsen talks about this in terms of how the Army wages war using fighting teams that are given a mission and are expected to work out how to achieve the mission as best they can given what they have or can use of what is available to them along the way to achieve their mission. These fighting groups form very close bonds and they cover for each other, and they make commitments to each other such as that they won't leave the field without their comrades unless overwhelmed. This model is also informed by the example of team sports where teamwork is the key to success. The traditional control based structure of organizations is fundamentally inefficient. In fact, during the cold war the Russians out manned the American and NATO forces 10 to 1, but the American Generals always believed the Russians could be beaten by NATO forces because for the Russians to move all orders had to come from the top, and no one was allowed any initiative. We saw the effects of this in the Iraq war where the Iraqi military (which was a Soviet style 'top down' control structure) fell apart because their command and control links were broken by American bombardment. In our form of Government everyone swears allegiance to the Constitution rather than to a dictator, and so during WWII we beat the two best armies in the world mainly due to the self-directed nature of our troops on the ground who would do extraordinary things to

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[18] See the Emergent Design dissertation by the author at http://about.me/emergentdesign

achieve the goals set for them by their generals, many times achieving things thought impossible by going way beyond the call of duty in sacrifice themselves for their fellow troops[19]. Of course, business is a different theater of economic conflict rather than conflict between nation states in warfare. But the same kinds of factors often lead to success, which is to allow teams to self-organize and self-direct, while providing them with proper guidance and an environment within which they can flourish. We need to nurture high performance teams based on a grounded theory of teaming that can explain why teams can enter into high performing Flow states. Individuals in hierarchies managed by single individuals bearing all the power and the only authority to make decisions are less agile and resilient and adaptable than empowered teams that govern themselves and direct themselves by consensus. It is only because we have reached the limits of what control based traditional organizations can generate in terms of productivity, that agile teams have been given a try in industry and the consensus is that they are much more effective than traditional managed workgroups. But to make the whole organization Agile and Lean at Scale is a huge transformation and a big gamble for companies although they are being driven to it by their competition who is gaining advantage from this kind of reorganization. This risk is less if we understand the basis of High Performing teams from a theoretical point of view, and also have a good grounding for our theory of how hyper-effectivity and hyper efficiency of teams is possible in a production environment when they are allowed to self-organize and to use their social intelligence to solve problems instead of solely depending on individuals under separate control who use their cognitive intelligence outside the cross-functional team context. Out of these theories that ground Agile and Lean approaches and our understanding of the basis for high performing teams we can then be guided as to how to build organizational structures that complement the teaming rather than serving as an impediment to them through the exertion of over determined command and control, which is unnecessary and hinders the operation of the teams at the various agile at scale levels.

Author

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[19] See The Foundations of Agile Teaming by the author for more information about Ultra Teaming