New Telco

Practices for transforming traditonal Telcos to an Internet Protocol world

version 0.3

Steam-bent wood construction by Paul Timmer

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Applying the Pattern Language:

The contents of this document are intended for application by experienced practitioners within Telcos, and the content provided by this document such should be sufficiently self-explanatory. However, all applications, derivative action, and decisions arising from the contents of this document are entirely at the risk and discretion of the practitioners. If you require assistance, we recommend engaging Embodied Making certified analysts and certified New Telco Pattern Language practitioners.

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INTRODUCTION

Incorporating changes in our individual lifestyle is difficult, whether it be learning new skills or changing our habits. Incorporating meaningful change in large enterprises with several individuals is exponentially more difficult. It isn't a single solution applied by a single individual that changes a large and complex enterprise, but several solutions applied simultaneously and coherently by several individuals. Given that products unify an enterprise — in that individuals collectively design, produce, sell, support, operate, and decommission them — we offer a set of solutions to transform enterprises on the basis of products. Pattern languages, which were originally conceived by Christopher Alexander as a means of describing effective practices within architecture, can be used to represent the knowledge required for product lifecycle management across a large enterprise. We do this by understanding the prevalent forces in the enterprise and finding positive solutions or patterns that are able to balance these forces.

TELECOM COMPLEXITY

Telecom operators are confronting business challenges that require deep changes within their people, systems, and organizations. With device manufacturers such as Apple, Google, and Samsung increasingly providing their own communications services, telecom operators are facing declining revenues from their staple offerings of voice, data, and messaging. The emergence of highspeed mobile Internet coupled with devices that offer users greater possibilities in service selection and consumption requires telecom operators to build on their existing strengths while capitalizing on new opportunities. Products focused around voice, data, and messaging need to be transformed and merged with new services that revolve around the connected work and life of users. The omnipresence of Internet Protocol (IP)–based networks makes it easier to create high volumes of diverse multidevice products, which will increase the complexity in the conception, implementation, operation, and retirement of products. Current inefficiencies will be further amplified given the product volume and diversity, and new practices will need to emerge in order to manage this unprecedented scale of complexity. Each of these new practices will have to be applied with other practices, creating an interconnected network of practices. These practices can help telecom operators effectively transform from value chains to value networks. Telecom operators have traditionally tried to manage product lifecycle processes through individual and independent projects, using waterfall or agile management methods. Products realized in environments that use a waterfall methodology have distinct phases for product innovation, product feasibility assessment, product implementation, product operation, and product retirement. Matrix organizations are often constructed to complement these distinct phases, and particular responsibilities are assigned to each phase. Distinct organizational units within the matrix organization have clearly defined roles and responsibilities, each producing a specific aspect of the final product. A single department that translates all business needs into designs (or a single group that manages all the data in the enterprise) is an example of these distinct organizational units. Such structures are useful for producing products that have similar characteristics.

These market trends were predicted as early as 2006. See Peppard, Joe, and Anna Rylander. "From Value Chain to Value Network: Insights for Mobile Operators." European Management Journal, Vol. 24, No. 2, 2006.

Historically, most commercial product offerings have had similar structures, making it possible to create relatively repeatable processes for their lifecycles. The focus of such organizational structures tends to be around product delivery rather than product retirement. These processes are analogous to the classic Ford Model T assembly line, in which each person in the assembly line had a defined role, received fixed inputs, and produced fixed outputs to achieve consistency. Figure 1 illustrates the treatment of product lifecycle processes in a waterfall method.

Figure 1 — Phases in the lifecycle of a product within a waterfall methodology.

Products realized in agile environments follow more fluid and flexible phases, where each phase has a tendency to overlap with other phases. There is recognition that features that seem very important for a product at an early stage might seem less important at a subsequent stage. Through understanding the complexity of tasks to realize a product, development can be prioritized by tackling the most complex aspects of a product first. Documentation and service-level agreements are kept down to a minimum and replaced by incorporating suppliers and partners as extended members of the production system. Processes themselves are constantly being adapted in the face of changing situations by practitioners who continuously apply improvements in their methods of working, following principles like "5 whys is 1 how." However, agile work environments are difficult to achieve in highly distributed teams within complex organizations. The inspiration for agile methodologies can be traced to the Toyota Production System as realized in the late 1970s, which introduced the Kaizen philosophy of production. Figure 2 illustrates the treatment of product lifecycle processes using agile methods.

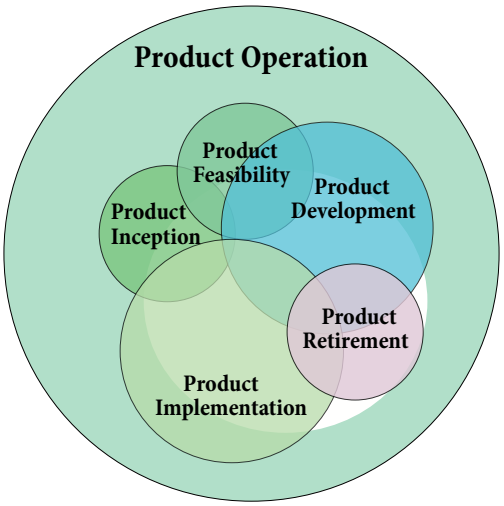


Figure 2 — Phases in the lifecycle of a product within an agile methodology.

Both waterfall and agile methods provide practices for structuring organizations for efficient product lifecycle management. There are other practices that can be applied to managing people, technological choices, organizational structures, organizational culture, and physical workspaces. These practices can be selectively applied in different combinations based on different situations and organizational cultures. The practices themselves can be classified based on their maturity. Best practices are typically established in situations where the correlation between cause and effect is obvious to all. Good practices require some analysis to establish a stable relationship between cause and effect. Finally, emergent practices typically come about when retrospective analysis is done on the correlation between cause and effect.

A pattern language can be used to describe such practices, indicating best practices with three stars and good practices with two stars. (If we had featured any emerging practices, we would have assigned these one star.) We first give a synopsis of the scale of complexity telecom operators confront today in each phase of a product's lifecycle. Next, we provide two examples from our pattern language, outlining the problem the pattern solves, the pattern's solution, and the linkage of this individual pattern with all other patterns. By using a pattern language, these practices can be woven in myriad ways for different products within the same organization, and the unique challenges a particular telecom

operator faces can be resolved using a unique implementation of these patterns.

DERIVING THE PATTERN LANGUAGE

The primary goal of developing a pattern language for telecom operators is to provide a flexible method for better dealing with the scale of complexity they confront in using new practices. The adoption of these new practices can require new organizational structures, changes in employee roles, the creation of new employee roles, and the gradual removal of existing practices. All these requirements for the adoption of new practices can be very difficult to achieve if the benefits of the change are not clear at every level of an organization. Patterns of change must be able to incorporate existing practices by absorbing their strengths and minimizing their weaknesses. Each pattern must be able to articulate the existing problems based on real situations individuals encounter, the solution for these problems, and the linkages of the pattern with other patterns.

In order to derive this pattern language, we have applied the Embodied Making method. The process of design with embodied making is intitiated by having conversations with people in the space where we want our designs to live. It starts by capturing stories, which are anecdotes as people relate them to us, and then faithfully recording them. We conducted around 120 interview sessions with people performing different roles in these organizations, ranging from customer service agents to product developers. All these individuals were involved in some capacity in the realization, operation, or retirement of products. From these interviews, we were then able to derive the prevalent forces from the processes of product lifecycle management. For instance, the following are some of the forces evident during the inception of a product:

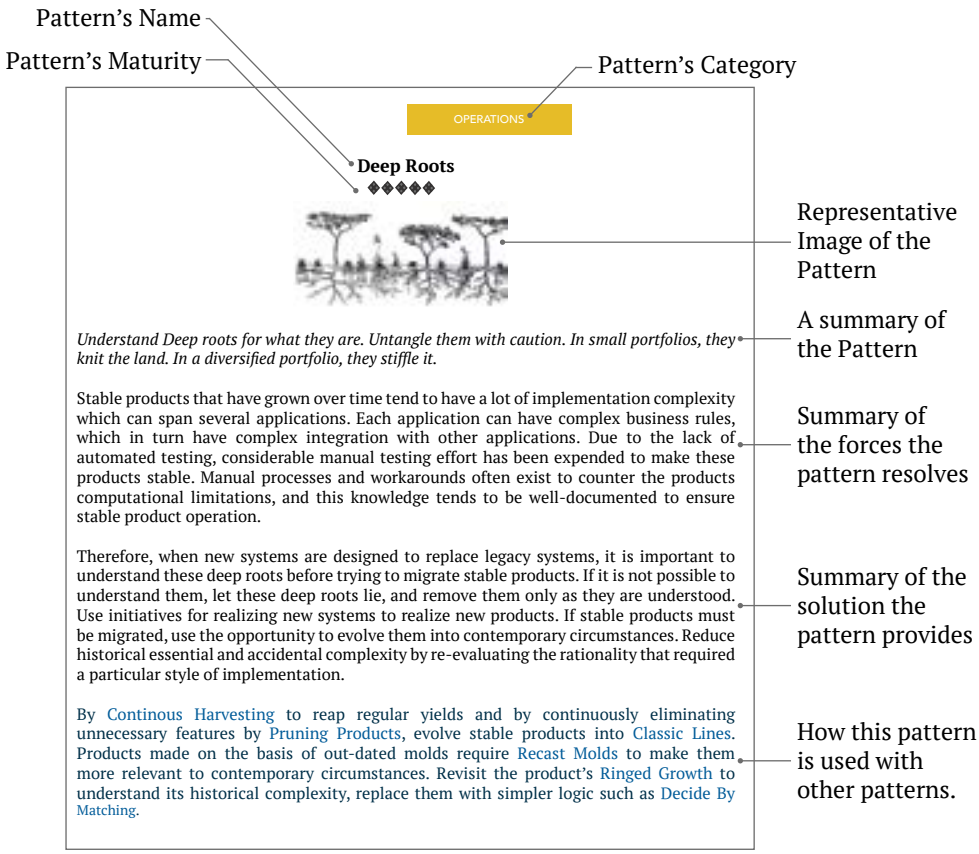
Reluctance to discuss immature ideas
Fear that ideas will be underappreciated
Concern that competitors may copy ideas
Desire to obtain idea feedback from experts
Inability to identify experts
Tendency of experts to prefer giving direct and personal feedback
Tendency to forget about ideas after a while
Skepticism of unconventional or disruptive ideas
Tendency of commercially successful products to get more attention

We have thus far identified around 800 individual forces that are common in most Telecommunciations Operators. These forces did not manifest themselves in isolation but rather in combination with many of the other forces. For instance, one reason for the reluctance to discuss immature ideas is the fear that the ideas will be underappreciated. A solution for resolving these forces would be to create an environment where anyone can submit an idea anonymously. However, this solution conflicts with other forces, such as the desire to get credit for good ideas and the fear that others will get credit for ideas that are not their own.

Another solution that resolves these forces is to create a forum where individuals can choose to submit their ideas either openly or anonymously, with the option to reveal their identity at a later stage. However, anonymity doesn't allow individuals to receive direct and personal feedback from experts, and it doesn't resolve another force — the tendency for a single individual to have limited insight about all aspects of a product. A solution that does resolve these additional forces is to require that for any idea to be adopted, it must be championed by three individuals who collectively consider its commercial, operational, and technological aspects. This continuous process of assessing solutions eventually provides a set of stable solutions that work well together, and each of these solutions is then restructured into a pattern. Wherever possible, the patterns are named after a common theme, such as a garden or town. As new patterns emerge, existing patterns are reassessed and redesigned to reflect their individual and collective interaction with other patterns. Together the patterns provide an interwoven pattern language.

HOW TO READ PATTERNS

There is no sequence to reading the Pattern Language, and it is possible to arbitrarily select any Pattern within this collection and makes sense of it in terms of the problems and challenges proposes to solve (forces), the nature of the solution (pattern), and it's relationship with all other patterns. Each pattern starts with a categorization, and for the moment, all patterns are either categorized by Organization Structure ( ), Market Strategy, ( ), Operations ( ), or Component Behavior ( ). This categorization reflects the salient purpose of the pattern, and it doesn't mean that a pattern about Component Behavior does not have some impact on Organization Structure. Patterns about Organization Structure are principally about how departments and leaders should organize work within a Telco. Market Strategy patterns are principally concerned with customer and brand experience, and the nature of propositions to customers. Operations patterns are principally concerned with the internal practices of anyone within a Telco. Finally, Component Behavior defines how technology should be configured and utilized. This doesn't mean that only technical people need to understand Component Behavior, or that only marketeers need to understand the Market Strategy. By understanding these patterns, everyone in a Telco, and in some cases its Customers or Suppliers, should have an understanding how a set of patterns being applied in one space influences others.



Each pattern has a memorable name, and wherever possible, we have used names inspired by gardening or urban landscapes, The use of a common metaphor makes it easier to relate patterns in terms of each other, although we have struggled to give names using a single metaphor. Next, each pattern can have different scales of maturity, indicated by diamonds (◆). A single diamond means that the pattern is experimental and practitioners should apply the pattern through cautious probing, retrospectively understand its consequences, and then apply in some measure again. Two diamonds imply that this pattern has been successfully applied a few times, but isn't part of any existing practice. Three diamonds imply that the pattern is an existing emergent practice, and several thought leading organizations are currently attempting it. Four diamonds imply that pattern is stable practice, and has been attempted several times successfully. Five diamonds imply that the pattern is stable and should be considered the standard practice. The diamonds should not be used to understand the patterns in terms of risk, and where in the interests of

risk aversion, only patterns with five diamonds are applied. The Pattern Language is most effective when applied collectively and cohesively. The diamonds exist for practitioners to understand the measure of reflection, both in the moment and retrospectively, required from each pattern.

We have often heard it said that leadership and managers in Corporates require everything summarized in powerpoint slides with no more than three bullet points. In our experience, most individuals in these positions occasionally read a novel or newspaper, and desire explanations that address brevity and clarity in a meaningful balance.

Next, the essence of the pattern is summarized in one or two sentences, giving those who want to skim the content or remember a previously read pattern the means to understand the pattern quickly. Next, the forces the pattern resolves are summarized. Forces influence how people experience a space, and are derived from applying Embodied Making. To quote the method:

"Forces are things that shape their environments to be the way they are. They give birth to experiences, such as the forces that make us book the holiday of our dreams at great expense, provide twists in the flow of an experience, such as the forces that choose a product to purchase from a variety of available products, sustain certain experiences over time, such as the forces that make us form orderly queues while waiting to be served, or bring an experience to an end to see the beginning of another, such as the motivations behind walking away before a performance has finished. Forces can be reflected in motivations, such as the desire to be compensated for providing a service. They can be statements of fact, such as the presence of a high population density. They could be hopes and anxieties, such as the desire not to lose our baggage while traveling or meeting a taxi driver who charges us fairly in an unfamiliar city. They can reflect dominant values, such as the desire for security or an aversion to feeling vulnerable. Some forces are rational, tangible, or measurable. These forces follow the logical structures of cause and effect, and their effect on the environments where they exist can be reasonably predictable. For instance, the repeated failure of a service over time will see falling demand for that service, and making a service extremely reliable comes at a great cost. These are incongruent forces that can be balanced with judging the right service level for the price customers of the service are willing to pay. Other forces are often irrational, intangible, or unmeasurable, such as personal beliefs and prejudices, but are extremely influential in determining the course of experiences and nature of the systems within which they reside. For instance, if the objective of the design process is to create an object to facilitate communications, and there exists a general cultural aversion to specific colors ("black is an unlucky color") or shapes ("sharp edges are bad feng-shui"), then these are forces that will influence the form of the solution." Extracted with permission from EmbodiedMaking.org

Next, a solution that resolves and balances these forces are described. The solution may be a practice or it may be tangible entity. It is the intent of these solutions to create a positive collective impact for Telcos and their Customers. Forces may also be resolved in the favor of individuals but unfavorably for the collective, and these practices are known as anti-patterns. Our hope is to use these patterns to create positive working spaces within Telcos, and therefore we have avoided structuring any anti-patterns. Finally, the relationship of the pattern is established with other patterns in terms of how they should be practiced collectively, by inter-purposing in sentences.

This body of work is constantly evolving, and we are continuously adding new patterns to the language. Our view in writing these patterns is to accept their incompleteness, impermanence, and imperfection, and we publish them as they occur. We leave it to practitioners to judge whether they are in a form worthy of being practiced.

Adapting with Life

We cannot predict the turns our lives will take, and our Telco Products adapt to changes in our lives rather than us adapting our lives to our Telco Products.

The majority of Telco products are structured around rigid contracts for fixed durations as subscriptions. Telcos in some countries have historically provided Customers subsidized devices. The subsidized devices are provided in exchange for a commitment to a subscription for a fixed duration with minimum monthly charges to cover the device's cost. In contemporary times, where the prices of a Smartphone is comparable to the price of a laptop, the minimal monthly charges can become higher than a Customer's projected consumption. Customers are increasingly willing to purchase their own Smartphones and only require access to calling, messaging, and data. If there are deep-rooted changes in a customer's life, such as losing their job or going through a divorce, their contracts usually remain the same. Customers are forced to project their contemporary circumstances for the duration of the contract, and purchase products based on their "best-case" consumption. Once they are into this contract, they feel locked, and are unable to make changes easily. Rather than a communications or lifestyle product that is responsive to changes in a person's life, it feels like purchasing a product from a Bank or an Insurance company. Telco products carry the impression of being loaded with heavy contractual terms, and miss opportunities to sell smaller one-off purchases, such as a single song without a music subscription, an hour's pass for high-speed internet, or a 1 week all you can call rate to an international number. Customers cope today with other solutions from other providers where they do not feel locked in, such as paying for an hour's worth of WiFi access with a hotel in a foreign country despite having a mobile subscription.

The Dunning process used by most Telcos is reminscent of how Banks and Insurance companies deal with defaulters. See "The worst mobile phone offenders - and how to complain."

WiFi is increasingly becoming a free commodity. See "The Price of Staying Connected."

Therefore structure Telco products to exist on a base platform where subscriptions can be added or removed at will. A subscription for unlimited calls can be replaced by a subscription for 200 minutes of calls per month at half the price with a few interactions in the space of seconds. Subscriptions become recurring unless explicitly stopped, and they can be stopped at any time. If the customer has a subsidized device, give the flexibility to add and remove subscriptions at will as long as their total charged subscription rate and consumption equals their minimum required commitment. Customers are able to purchase one-off products at competitive prices, such as a single TV episode, an hour's high-speed internet access, or a week's pass to call an international number. In difficult moments of a customer's life, such as the moments when they lose their job or a loved one, give them the complete flexibility to tailor their subscriptions in any way they want, to the extent of removing all subscriptions. Provide clear communications to customers that explains the reasons for the flexibility being the desire to develop empathy with the customer's situation.

Understand the nature of change through the stories of the Participating Customer Demographic, and correlate situations to product structures in the Productpedia with Ones just like that One. Understand a customer's exact situation through examining the Aware Instances and their Change History, and assessing their loyalty with how much they possess in the Base currency of our Own. Give more freedom than usual in these situations so Customers create their Own install base, and suggest One just like that One as alternatives.

Aware Instances

Components are aware of their role in fulfilling products, and product instances contain their own unique semantics. Awareness isn't elsewhere, but with the component itself.

A product instance, or a product as a customer experiences it, is realized through several systems, ranging from configuring access in a network switch to a customer record in a customer-relationship management system. Each of these systems have a part in constructing the customer's experience of the product. Network equipment in telecommunications environments historically have a lot of variation, often supporting standards from the 1980s such as GSM to contemporary standards such as LTE. With the move to an all Internet Protocol (IP) network, where will be an even greater diversity and volume of products with providers moving beyond voice and data to content (music, movies, books, education, etc.), several configurations will be possible in each of these system. This will lead to high-levels of complexity in managing all of these combinations. Processes for provisioning products need to anticipate several eventualities, to the extent that process definitions need to be conscious of the state of several network elements and systems simultaneously. When controllers are used to control the a number of states, the controllers need equal or greater knowledge than the total number of states. Similarly when product, customer, and resource specifications are used to define the behaviour of instances, the specifications need knowledge equal or greater than the sum of instance variations. When provisioning processes are treated as end-to-end transactions, errors in the process necessitate restorations of original system configurations before the product was provisioned through an expensive rollback. Rule-bases for individual situations such product pricing (promotions, discounts, fees, allowances, commissions, etc.) or permitted products given an individual's installed product base further increase complexity. In the highly distributed environment of telecommunications organizations, several components are able to change each other's states, and controllers and specifications need to consider meaningful combinations of state. However if the controllers and specifications are not aware of a combination of state, which can number in the several thousands, systems recovery can only be established through restarts. Given that stable systems require their control mechanism to address as many variations of state as possible, creating centralized controllers and single points of truth only increase the complexity, not reduce it. "Things fall apart, the centre cannot hold."

Ross Asby, the creator of the law of requisite variety, succintly summarized "variety can destroy variety". Ashby, W.R. 1958, Requisite Variety and its implications for the control of complex systems, Cybernetica (Namur) Vo1 1, No 2, 1958.

For a thorough analysis of distributed state control, see Moseley, B., Marks, P., Out of the Tar Pit, 2006.

From the opening lines of "The Second Coming by W.B. Yeats: Turning and turning in the widening gyre, The falcon cannot hear the falconer;
Things fall apart; the centre cannot hold;

Therefore make product instances exist integrally where they have knowledge of the components that realize them, and conversely, the components that realize them have knowledge of the product instances that reside within them. Instances are aware when they are unfulfilled, and are capable of being fixed individually. Make it possible for instances to have individual and unique behaviour, and for customers to have their unique situations reflected in the system. When systems aren't capable of enabling unique behaviour for instances, utilize proxies for in systems with that capability.

Use the Language for Product Instances to reflect product instances and the customer's situation and use the same Language for Product Instances to interpret the customer's unique situation and install base. If the customer is experiencing problems with their product, permit customer agents to Change it with Confidence within the Fortified Town. Enable Product Markers that describe the product instance's performance, costs, and efficiency.

Base currency of our Own

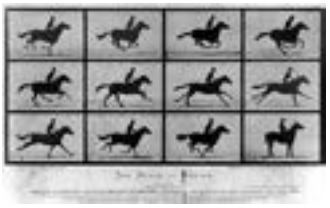
Operators have their own Base Currency, and Customers are compensated with a Telco's own Products. Conversions to 3rd party products, such as Retail Loyalty Points, is done from the Base Currency.

Customers who have been with a provider for a long time

Therefore compensate customers in terms of the Telco's own products, and charge them more or less

to be continued...

Change History



Every change to any aspect of information relevant to a Product, Customer, or Service is always immutably remembered. Changes and their causes can be retrospectively understood without knowing in advance what needs to be understood.

to be continued…

to be continued…

to be continued…

Changeable by Many

Anyone in a Telco, irrespective of whether they are from marketing or technology, should be able to configure the most frequently occuring changes themselves.

Modifying the behaviour of a product's feature, adding new features, or removing unused ones can de-stabilize the product when the dependencies between features are poorly understood. In demand-supply organizations, the problem is further amplified when changes have to be specified by the demand organization in great detail, approved by the service management organization to ensure that the operations of the existing product is not de-stabilized in any way, and finally accepted by the supply organization when the nature of the change is clearly understood. Things that seem important at the begining of a product lifecycle seem less important after the product has been in operation for a few years, which is reflected in different change requirements for the product. The individuals who demand changes with a commercial focus usually specify what must be changed, rather than executing the change themselves. In complex environments with several products, comprehensive and detailed specification is required to make product changes, and the knowledge of how to make these changes is only understood by a few individuals in the supply organization. Only the most critical changes are implemented, and retrospective minor improvements are difficult without going through an expensive and laborious change management process. Excessive configurability introduces greater complexity, and the introduction of greater complexity without a proportional increase in value gradually chokes an organization's growth.

Therefore avoid making the product excessively configurable when it is first being realized, and focus on ensuring the product's dependencies are clearly understood. Once the product is in operation, identify the few changes that are required most of the time, and make those configurable. Make configuration knowledge necessary for every product stakeholder, regardless of whether they have a commercial, implementation, or operational focus. Focus on the configurability of an individual product first, rather than seeking structures to configure several products simultaneously. Delay "future-proofing" the product's configurability by trying to predict the aspects of the product that might require configuration someday by focusing on existing patterns of configurability. Introduce configurability in a manner that commercial, technical, and operational staff can make changes. If a product really requires a high quotient of configurability, prefer making changes in source code over configuration files.

Make a product's Configurability Inverse to its Complexity, and ensure investment in a product's configurability develops through its Ringed Growth. Make the salient features of the product configurable by any of the Three Champions. Through Constant Circulation where all products are Planted in a Single Garden, and continuously Pruning Products by a Few Skilled Gardeners, keep the configurability of products proportional to their value.

Classic Lines

Recognize, foster, and grow Classic lines. Keep a few of these moulds. Some products never grow old. Not everyone wants the latest toy. It just looks that way to technocrats.

The Telecommunications industry is characterized by frequent technological advancements which enable new products. These products enable faster speeds, improves the quality of communications, and permits the convergence of telecommunications services utilizing common enabling technology. While technology-savvy customers are eager to try out emergent technology, there exists a customer base for more traditional products. For instance, customers who prefer mobile devices that just make phone calls but have long battery lives are increasingly faced with fewer and fewer choices. In some cases, the need to migrate old technologies and consolidate it with newer technology leads to initial levels of poor service quality and unfamiliarity with the product, such as the case of migrating customers using voice with ISDN access to voice with IP access. Withdrawing older products with loyal customers can lead to losing them despite giving them newer alternatives based on advanced technology.

Therefore identify products that have loyal customer bases, display stable patterns of consumption and usage, and provide user experiences that distinguish them from other products. Create virtual and physical spaces where users can share their passions about products with other users. Understand the situations where customers use these products, and their utility as communications enablers. When changing the underlying enabling technology to another, try and recreate the user experiences in forms that find a balance between the new technology and existing ways of work. Avoid excessive skeumorphic design in trying to preserve classics, such as preserving rotary dials on digital telephones [1], but also avoid radical new forms that depart from existing forms without providing sufficient utility. If a classic product cannot be continued, migrate classic users by explaining how alternatives preserve the key characteristics of these classics.

Understand a product's usage patterns with the Participating Customer Demographic, and encourage the Three Product Champions to determine timeless characteristics of their products as Signature Aromas. Expand on this understanding by speaking to users in the Low-walled Town Communities for product initiatives where the Whole Town Participates. Create internal product fan clubs around the Town Well, and owner fan clubs beyond the walls of the Fortified Town.

Clear Withering Products

When the product starts to wither, clear it and replace it with new products.

Telecommunications products are launched within a specific market context which can consist of specifically identified consumer needs and wants, prototypical consumer behavior, and required consumer education and security. If the gap between the product's original purpose and the contemporary circumstances is far to broad, the product's market penetration and sustainability will start to wither. Attempts to regenerate these products with broad gaps require revisions in their original marketing and operational strategy. These products with broad gaps also tend to have small and shrinking customer bases, and their continued operation incurs low or negative profitability. Despite best intentions, products that neglected due to shifts in organizational focus tend to wither over time. Although these products are soon removed from commercial catalogs to avoid new customers, they continue to be operated for existing customers leading. This leads to reduced organizational focus, brand dilution, reduced overall profitability, and increased operational complexity.

If a product's market reach and customer base shrinks to the extent that it incurs low or negative profitability, first explore the possibility of whether it can be easily transformed or altered to improve its commercial sustainability. If the transformation of the product requires greater effort than its market potential, remove the product. If the complete removal of the product is extremely difficult due to its implementation, create operational procedures to demarcate its non-operation, and deprecate these practices when migrating to new systems.

Use Product Markers to understand the criteria for a product's success, and through Constant Circulation by a Few Skilled Gardeners where all products are Planted in a Single Garden. When Product Markers indicate a product's decline, engage the Three Product Champions and the Participating Customer Demographic to understand the original market context and the reasons for the product's decline. Attempt to transform the product based on Recast Moulds and utilize Growth Supports if the product exhibits potential. If all else fails, remove the product from all operational and commercial activities. If the product has Deep Roots, let it lie and deprecate it gradually from commerical and operational activities.

Configuration inverse to its Complexity

If a product has a few configurable options, configure using a proprietary language. If a product is highly configurable, configure using source code.

Products rarely have a stable set of characteristics, and their characteristics and behavior need to be modified continuously throughout their operation. These changes can range from price alterations, taxation adjustments, device dependencies (e.g. change the device offered with the product), promotional offerings, to modifications in enabling technology. The ability to modify a product's characteristics and behavior during its operation is defined as its configurability. Each configurable option introduces an alternate variable state, and each possible state introduces greater complexity. Business stakeholders often desire their product's to be easily modifiable, increasing the product's configurability requirements. The introduction of each configurable option increases the system's complexity and maintenance becomes more difficult and expensive. Systems with several configurable options require specialized knowledge, which tends to become entrenched with a few individuals. Similarly, vendors offering proprietary systems that are highly configurable require specialized knowledge which is more difficult to obtain than those of open languages.

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Therefore introduce product configurability extremely cautiously. If a single system requires a few configurable options, offer configuration through proprietary configuration settings. If a single system requires several configurable options, manage their configurations directly through source code developed in open languages. Avoid the use of central controllers that configure several systems simultaneously, and build awareness of configurations spanning multiple systems within each of those systems individually.

The Few Skilled Gardeners and Three Product Champions collectively decide what to make configurable in a system,avoiding excessive configuration whenever possible. The configurability of a product is altered throughout its Ringed Growth.

Constant Circulation

Always have a few new products being introduced as a few products are being retired.

Given the virtual nature of telecommunications products, it becomes possible to easily release several variations of the same product with different pricing structures for customers to create product diversity. Consequently, most telecommunications operators tend to have large volume of products, regardless of whether products are counted on the basis of distinct types of commercial offerings or on the basis of underlying enabling technology. The boundaries and distinctions between products are often difficult to comprehend, whether they exist in commercial catalogs, information systems such as customer-relationship management systems, or in network elements like switches. The introduction of new products becomes difficult due to the capacity constraints from operating existing products.

Therefore create constant circulation where as a few products are being introduced, others are being removed. Maintain the configuration and implementation of individual products as distinctly as possible in order to reduce complexity in their removal. Avoid the merger of many products into a single product line where the distinctions between products are lost, and maintain distinctions between high performing products and poorly performing products.

Have a Few Skilled Gardeners tend to products Planted in a Single Garden, while constantly Clearing Withering Products and introducing new products with Growth Supports that receive Shade From Others.

Continuous Harvesting

A product, once planted, is harvested continuously. In projects, it would be forgotten once planted.

When products are first implemented and launched, they receive sales, marketing, technology, and operational focus. Sales channels and marketing campaigns are focused on making the new product commercially successful and embedding it in the consciouness of potential customers. With the spotlight turned in the direction of new products, the attention on older products wanes to the extent that they are commercially withdrawn. The same cycle continues on the new products, which are soon replaced with newer products. As products realized through projects, it becomes difficult to manage and understand their lifecycle once the projects have been complete. Nevertheless changes are made to the product through other projects, such as projects for regulatory compliance or technology migrations, or through individual changes to add or modify features of the product. The product's contribution to the company's profitability and brand is poorly understood as the spotlight moves to the next big product launch.

Therefore when products first conceived, there should be notion of how they will be initially realized, launched, grown, operated, and their criteria for removal. Product managers should be assigned to products from the moment of their conception, and each Product Manager should have a fixed number of products in their portfolio. Products should contribute to the profitability of the company throughout their operational lifecycle, and their history of change and adaptation while being in operation should be easily visible and accessible.

A Few Skilled Gardeners should keep products in Constant Circulation through Pruning Products, Clearing Withering Products, evolving them on the basis of Recast Moulds, and identifying stable characteristics as Classic Lines. The Few Skilled Gardeners constantly create Product Markers for each Product in their care to make their characteristics and performance transparent to everyone within the Fortified Town.

Customers create their Own

Customers can create their own Products by combining Product Elements themselves so that no two Customers have the exact same Product.

to be continued...

to be continued...

to be continued...

Decide by Matching

Equate supply and demand with matching. Qualify customers upfront through their characteristics, and matching them with product characteristics.

Products rarely have a stable set of characteristics, and their characteristics and behavior need to be modified continuously throughout their operation. These changes can range from price alterations, taxation adjustments, device dependencies (e.g. change the device offered with the product), promotional offerings, to modifications in enabling technology. The ability to modify a product's characteristics and behavior during its operation is defined as its configurability. Each configurable option introduces an alternate variable state, and each possible state introduces greater complexity [1]. Business stakeholders often desire their product's to be easily modifiable, increasing the product's configurability requirements. The introduction of each configurable option increases the system's complexity and maintenance becomes more difficult and expensive. Systems with several configurable options require specialized knowledge, which tends to become entrenched with a few individuals. Similarly, vendors offering proprietary systems that are highly configurable require specialized knowledge which is more difficult to obtain than those of open languages.

Therefore introduce product configurability extremely cautiously. If a single system requires a few configurable options, offer configuration through proprietary configuration settings. If a single system requires several configurable options, manage their configurations directly through source code developed in open languages. Avoid the use of central controllers that configure several systems simultaneously, and build awareness of configurations spanning multiple systems within each of those systems individually.

The Few Skilled Gardeners and Three Champions collectively decide what to make configurable in a system,avoiding excessive configuration whenever possible. The configurability of a product is altered throughout its Ringed Growth.

Declarative Component Dependencies

Components are aware of their relationships with other components and the Products they realize through a standard language. Products have standardized metadata to describe the components used to realize them.

to be continued...

to be continued...

to be continued...

Deep Roots

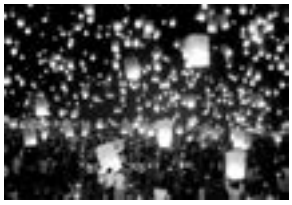
Understand Deep roots for what they are. Untangle them with caution. In small portfolios, they knit the land. In a diversified portfolio, they stiffle it.

Stable products that have grown over time tend to have a lot of implementation complexity which can span several applications. Each application can have complex business rules, which in turn have complex integration with other applications. Due to the lack of automated testing, considerable manual testing effort has been expended to make these products stable. Manual processes and workarounds often exist to counter the products computational limitations, and this knowledge tends to be well-documented to ensure stable product operation.

Therefore, when new systems are designed to replace legacy systems, it is important to understand these deep roots before trying to migrate stable products. If it is not possible to understand them, let these deep roots lie, and remove them only as they are understood. Use initiatives for realizing new systems to realize new products. If stable products must be migrated, use the opportunity to evolve them into contemporary circumstances. Reduce historical essential and accidental complexity by re-evaluating the rationality that required a particular style of implementation.

By Continous Harvesting to reap regular yields and by continuously eliminating unnecessary features by Pruning Products, evolve stable products into Classic Lines. Products made on the basis of out-dated molds require Recast Molds to make them more relevant to contemporary circumstances. Revisit the product's Ringed Growth to understand its historical complexity, replace them with simpler logic such as Decide By Matching.

Events Everywhere



Product instances produce immutable events to reflect things that have occurred at a certain place during a particular interval of time.

The Telecommunications industry has perhaps understood the role of Events in their architecture better than any other industry. Call Detail Records (CDRs), which are created by network elements after a telecommunications service has been utilized, have been used to record network usage for several decades. Historically, CDRs have been used to interface between Operations Support Systems (OSS) and Business Support Systems (BSS). OSS processes usually address concerns around operating the network itself, such as managing network inventories, network components (e.g. switches), and network faults. BSS processes usually address concerns around supporting customers and commercial offerings, obtaining and processing orders, processing bills, and collecting payments. OSS systems have historically been engineered to be highly distributed and fault tolerant, soft-real-time, operate non-stop, and support hot-swapping, where the system's behaviour can be changed (within limits) without stopping the system. BSS systems have historically utilized a client-server architecture utilizing transactional storage, typically with relational databases. Given the differences in the paradigms used by OSS and BSS applications, it has been historically important to create a stable and fixed data interchange format within CDRs to reflect call activity. However, people are now doing a lot more than making calls, and network systems need to be capable of capturing a wide variety of events, and BSS applications need to be able process these events. The use of normalized data models, where data is separated and categorized based on its intention or behaviour, and strongly-typed data models, where distinct data exists for each specialized purpose, will result in an extremely high scale of complexity to the point of being unsustainable.

Therefore the usage of any product should result in the creation of an event. Events should be created using de-normalized data models, where data is mostly unstructured with data elements possessing self-contained descriptors, and as weakly typed as possible, to the extent where all Events use the same object definition and contain a de-normalized data payload. The emergence of Software-Defined Networks, where network applications are built by software programs, further blur the historical distinction between BSS and OSS applications. Each application can consume Events, and create their own meaning around the Event. Events are stored in a single environment, and business intelligence and analytics can also be performed directly these events.

Many products co-exist, and their Aware Instances produce events that can be consumed by a wide variety of applications.

Exotic Plants

Introduce Disruptive Innovations in their own spaces, and fuse them in with other products cautiously.

Stable processes for realizing and operating process are often based on continuous innovations, such as "yet another price plan". New product ideas, and particularly disruptive innovations, that are different from existing products are often judged by the criteria used to judge existing products. Waterfall processes are tailored with templates with the assumption that one solution delivery is like another. In these cases, analysts can sense the problem through requirements, analyze the requirements based on existing delivery capabilities and behaviour in the past, and deliver solutions based on existing capabilities. Disruptive innovations, that introduce products the organization has never delivered before will require new architectures and new ways of work. Formal requirements are difficult to develop upfront as uncertainty surrounds the disruptive innovation in the beginning. Business concepts have a tendency to be vague, and rely more on competition mimicry, cherry-picking features from competitors, resorting to behavior like "make it just like the competitor". Business value of disruptive innovations are difficult to rationalize, especially as there is no precedent for the products unlike continuous innovations. Most business value argumentation is based on competitor behaviour, which may not be resonant with brand. When judging new concepts, business impact is often judged to be "high" due to uncertainty and non-repititiveness. Demands will have a tendency to be judged as immature over protracted periods of time, as they will be benchmarked to continuous innovations, leading to extensive delays. Here analysts will have to deal with greater uncertainty, requiring some extent of probing with different solution structures, then sensing the needs, and then providing analysis. In these disruptive innovations, requirements are difficult to flesh out upfront as previous experience is not helpful, and things that seem very important at the beginning of a project are not so important later. In environments with legacy systems, there is a desire to build disruptive innovations on greenfields. These greenfield environments give some initial flexibility,but if old rationality is applied to new ideas, they soon mimic legacy systems using new tools. Waste is often incurred in the beginning of realization processes for disruptive innovations by procuring all the support tooling and platforms for it from scratch.

Therefore realize disruptive and unconventional products using processes different from those used to realize conventional products. Provide the flexibility to change priorities in the development of product features based on newly obtained insights (e.g. market insights, technological learnings, and partner capabilities), unforeseen circumstances (e.g. additional complexity, market changes, etc.), and commercial opportunities (e.g. new customers, new demands from existing customers, etc.). Use these processes to realize features in products incrementally, and introduce products in their minimal form to the market as early as possible to test and understand customer response. Initially market, sell, implement, operate these products in an area of their own, and as their effect on the existing product base is better understood, merge them cautiously with existing marketing, sales, technology, and operational processes.

Disruptive innovations are Planted in a Single Garden within their own Themed Area using the most skilled amongst the Few Skilled Gardeners to market, sell, realize and operate the products. Provide ample Growth Supports when first introduced, and ensure Ringed Growth by offering the Product to customers as early as possible. Influence conventional product thinking by introducing the salient features of successful disruptive innovations when Recasting Moulds. Repurpose Equipment to realize these disruptive innovations in order to reduce waste, but apply repurposed equipment in new roles conducive with the paradigms introduced by the disruptive innovation.

Few Skilled Gardeners

Have a few good gardeners to tend to products throughout their lifecycle.

Given that products are usually launched through projects, and that projects to realize products are primarily focused on their launch, products tend to be fall to the wayside as the spotlight moves to the next product launch. The most talented individuals in the organization are allocated to the next big product launch rather than making the products of the last big product launch more efficient or being involved in the removal of inefficient products. Establishing product ownership in large organizations where each department has a different focus for the product tends to be difficult. This leads to products not realizing their true potential once launched, and a proliferation of products with marginal contributions to the organization's profitability. If Product Managers are solely responsible for administering launched products across departments, their perceived value is from the number of products they administer, rather than how actively they contribute to the profitability of the company.

Therefore selectively assign a few talented individuals as Product Managers, and establish this role as one of the most prestigious and well-compensated knowledge roles. Individuals that have strong communication skills, good market knowledge, strong technical knowledge, and operational experience are good candidates for this role. These individuals must also possess a strong network within the organization, with an understanding of how to get things done efficiently. Engage these individuals in actively realizing one or two products, operating three to five products, and retiring one to two products in large organizations simultaneously. In smaller organizations, there is greater capacity to realize, operate, and retire products given that there is less communications required for each of these activities. For the products being operated, give each Product Manager a few products that have low profitability but have great potential, a few stable and profitable products, and a few products with seemingly no hope of improving profitability. Periodically the Product Managers should exchange their most stable products with other Product Managers, which could be as often as 6 months in smaller organizations, and annually in larger organizations. The most successful product managers should be established as knowledge mentors for other product managers, and earmarked for leadership roles in the organization.

The Three Product Champions, who understand the commercial, operational, and technological aspects of the product, and the Participating Customer Demographic, who are representative of the customers who would use the product, work with a select few Product Managers to Continuously Harvest, Constantly Circulate, and Clear Withering Prpducts. Product Managers engage in the realization of products by adequately planning their Ringed Growth, ensure that newly launched products receive Shade from Others and Growth Supports within Themed Areas, constantly Prune Products in their operational portfolio, establish key criteria for the product's adoption with Product Markers, and ensure that Products don't grow Deep Roots. When Exotic Plants must be Planted in the Single Garden, it is entrusted to one of these select few individuals. Their products can be Changed with Confidence by themselves and any of the Three Product Champions, giving them Signature Aromas that highlight the product's salient traits, to spread adoption and knowledge across the Low-Walled Town Communities and beyond the Fortified Walls in controlled circumstances with selected partners. They frequently visit the Town Well to speak to others in the organization, and create a culture of Specifying to Operationalize, which requires that the documentation around the product is just enough to make it operational. When products

don’t work well, they place them in Temporary Splints until they do. They concept new ideas within Trusted Circles using Living Prototypes and Living Data Everywhere, and create initiatives where the Whole Town Participates.

Fortified Town

Competitive differentiators need to be protected. Market access to customers and suppliers through open and supervised gates.

Telecommunications companies increasingly operate under intense competition with similar or comparable products. Early mover advantage, spectrum ownership, and network coverage are examples of areas where this intense competition exists. Knowledge of new products and ideas, if are leaked to the competition, would mean the loss of an early mover advantage. At the same time, telecommunications operators also have to collaborate with competitors on national policies, such as number porting, international policies, such as roaming, and industry standards, such as data exchange standards. They also tend to use common vendors and suppliers.

Therefore protect new product ideas and competitive advantages through a secure communication environment. Products that differentiate an operator from the competition should be developed internally, and products that are commoditized should be procured from common vendors. Emphasize the importance of secure communications with all employees who engage with competitors in their collaborative roles for policies and standards. In areas where resources are shared between competitors, such as shared number porting repositories or the implementation of inter-network traffic, work with each other to establish best practices. Engage with common vendors in competitive areas with caution, and ensure that vendors maintain firm segregations between customers. In areas of collaboration with competitors, engage with common vendors on the basis of best practices established through open communications. Establish and engage in communities of non-competitive telecommunications operators to exchange best practices.

Establish a secure environment within the organization, and regulate market access to customers and suppliers through supervised gates. Maintain [Low-Walled Town Communities] and establish [Trusted Circles] within this organization. Use initiatives where the [Whole Town Participates] to explain the importance of confidential information and keeping customer data secure at the [Town Well].

17 Growth Supports

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Trellis, Girdle, Stake. Create just enough structures to help a product grow with time.

New product initiatives are often used to realize previously unfulfilled initiatives. There is a desire to reuse existing experiences and existing investments, although they might not be the best way to realize a product. Products are often launched carrying a lot of expectations on their backs. In some cases, products can be used sold in ways that they weren't intended to be used, and these unanticipated applications can lead to problems in their market perception. Early failures, either because of technical teething problems, poor market adoption, or negative feedback can cast a new product in a poor light, sometimes to the extent that it is rapidly removed. Disruptive innovations, in particular, can face greater scrutiny than other products due to skeptics or champions of existing products. When products are launched, not everyone is aware of their launch, and problems with the product can often disrupt activities of individuals with no prior involvement in the product. For example, customer support agents who have not learned about a product's launch may receive calls from customers who are encountering problems with the product.

Therefore provide new products with the support they need to fuel their initial growth. Identify the salient purpose of the product and use that to base its essence. Identify what makes the product unique compared to other products in the portfolio and market, and launch products with the minimal set of functionality that fulfills its essence. Avoid grafting features from other stable products that deviate from its salient purpose and essence. Instead, try determine how the new product complements existing products, and how the most stable products, and the customers of the most stable products, can be used to support this new product. If the new product has a completely different market from conventional products, market it with products from partners that best complement its intended market. Make new product launches as visible as possible, and encourage individuals within the company to use them before their public launch. Counter skepticism about the product with clear criteria on the product's success and failure. Instruct sales, marketing, and operational staff to provide extra attention on a product that has just been launched, and ask them to anticipate unforeseen issues. If there are technical problems that impact the stability of the product, be as clear and transparent to customers about the nature of the problem and which parts of the product can still be operated. As the product stabilizes and gains market share, slowly refocus the additional support on other products.

Protect newly launched products from fierce elements by ensuring they receive have gradual and [Ringed Growth] and remain true to their [Signature Aromas] with a minimal set of features. Establish [Product Markers] that define their criteria for success and failure, and protect them from skeptics by giving them a chance to grow in the [Shade from Others] which the complement existing products well, and by placing them within [Themed Areas] that mark their distinctive qualities. [Exotic Plants] may need more shelter than others, and use the [Three Champions] and [Participating Demographic] to first launch the product within [Trusted Circles]. Ask the [Low-walled Town Communities] to help the product's initial growth with the [Few Skilled Gardeners] keeping a close watch on the product's behavior in the first few days after its launch.