Process Architecture: Representing the Boundary View

Part 2 of a series on Process Architecture

Many PMOs, Engineering Process Groups, and process improvement teams are disciplined in their approach. They run their efforts as a project, with plans, schedules, metrics, and so forth. They recognize that rolling out policies, processes, and procedures can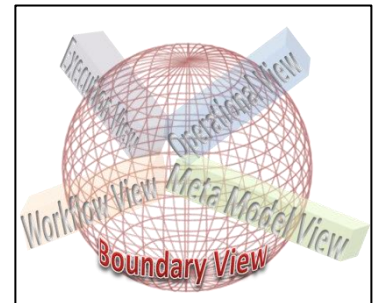 represent a significant cultural and change management challenge, so they incorporate specific messaging, training, and change leadership strategies into their plans. At the end of the day, however, the processes they publish are not actually used. Why? When we track back to the beginning of their initiative, we often find that **they gave short shrift to process architecture and design.**

> *"If you think good design is expensive, you should look at the cost of bad design."*
>
> Dr. Ralf Speth
> CEO of Jaguar Land Rover

In the first article of this series, we discussed what Process Architecture is and why it should matter to people charged with process definition and improvement. We introduced the notion of using multiple viewpoints as the basis for designing a process system that will be both *usable* and *useful*. In this second article, we explore one of these viewpoints, the **boundary view**. Here, we will consider the process system as a whole, not its constituent parts (we'll discuss those in a subsequent article.)

So, let's think about what we, as process builders, are actually building. Framing the boundary viewpoint requires a "Systems Thinking" approach, because we are, in fact, creating a system. It is a system whose aim is to present in a usable form the processes that make up the business systems we are documenting.

Stephen Covey's classic book, *The 7 Habits of Highly Effective People*, emphasizes Habit 2: "Begin with the End in Mind." Covey uses the example of building a house; of employing a blueprint to express a vision, and having a *conscious* vs. *incidental* design. That is exactly what we are talking about with respect to process *system* architecture!

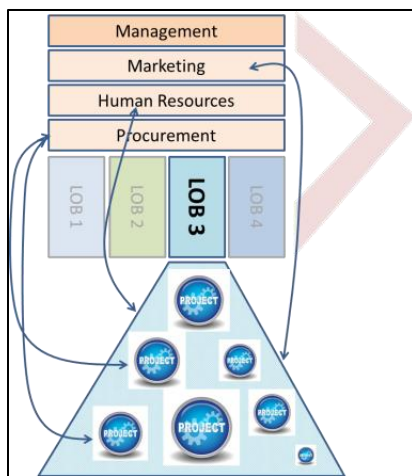Think for a moment about characteristics of a **system**:

1. any system can be nested inside another system
2. all systems are encapsulated (meaning, each one has clear boundaries)
3. systems receives input from, and sends output into, the wider environment
4. a system exists to fulfill an intended purpose
5. a system is composed of interacting, interdependent parts

While each of the first three characteristics above warrants individual consideration, we will look at them together for purposes of this article.

Process System: Scope, Boundaries and Interfaces

We should always begin a process initiative with an understanding of how our process system will fit into the environment in which it must function. And, we need to take a wider view and think about how the actual processes we intend to capture fit into the greater process which is the operating organization/enterprise. So, one aspect of expressing this view is to answer the scope question: *what part of the business and how much of the work flow/value chain[1] are we capturing?* It may be challenging to answer this question, even when an initiative is localized inside a line of business or a specific department, because an organization, by definition, is itself a complex system of systems. Our process system may have to recognize and interconnect with existing process governance (e.g., web pages in the intranet). So we need to be aware of the how our processes and the people who perform them fit into the overall organizational process.

Defining the boundaries of a process system is never easy, even when the context is well understood.

Let's take an example: Assume that your line of business is partnered with commercial and government agencies to build healthcare systems for hospitals. The process system you wish to deploy will capture how the organization wins contracts and manages them from inception to deployment. The process will define various proven systems development life cycles plus management and technical approaches. It will be used by teams working on each of a large number of concurrent contracts. However, in order to accomplish the broader functioning of the organization, corporate level marketing, IT, human resources, procurement and legal process are also required, just to name a few. So, does the scope of your process system define ALL the steps needed to get work done, or only the steps owned and controlled by your line of business? Your process is likely nested inside a larger one. But, is the larger process more than just tribal knowledge? If so, how is it captured and depicted? Where does this larger process reside and how is it accessed?

So, your first task is to understand the overall business process context and landscape in order to get a clearer understanding of your process system's scope, boundaries, and important interfaces. This will entail a bit of research. Some areas to explore are:

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[1] A value chain is a set of activities that an organization carries out to create value for its customers. Understanding how all the divisions and departments in an organization are interconnected and understanding which of these a supporting and which are primary. The way in which value chain activities are performed determines costs and affects profits, so this tool can help you understand the sources of value for your organization.

- Does my organization already have an overall business model, process map or value chain diagram that shows how work gets done?
- What best characterizes the scope of my initiative – what processes are *inside* my boundary?
- What types of work, what lines of business, what kinds of products/services and/or customers/contracts are inside and what types are *outside* my boundary?
- Do process systems exist for support functions or *other* lines of business (outside my boundary)? How are they related to my scope and business processes?
- For any other process systems: by what medium are they presented to the user and are they current? (Are they up to date, or vestiges of systems that have fallen into disuse?) Is there an active process team with which I need to interface?
- Is there a corporate expectation for process definition? Are there organizational standards (format, look and feel, process taxonomy) in place for depicting processes?

The answers to these questions will help you determine what is within your scope and what is outside it. This is crucial! It will help in determining the size and complexity of your initiative, and help to reveal any other process systems and teams you may need to interact with.

Process System: Purpose

The answers to the questions above are only part of establishing the boundary viewpoint. We must also ask some WHY questions: *1) Why are we investing in capturing and standardizing processes in the first place? ,* and *2) What do we hope to achieve from a business perspective?*

Stephen Covey has said, "To begin with the end in mind means to start with a clear understanding of your destination." Don't underestimate the importance of clear **mission** and **vision** statements. These statements should not be throw-away verbiage, committed to paper merely in order to check a box, then subsequently ignored or forgotten. Clear statements of mission and vision are powerful, and can *literally propel you toward your solution.*

The **mission** statement expresses the overall purpose of the organization or department – the reason it exists and does what it does. If the mission of the organization in scope for the process initiative has not previously been spelled out, it's extremely valuable to do so. This statement might be couched in terms of the revenue it helps generate, the value it delivers to clients, or the support function it serves to the overall organization.
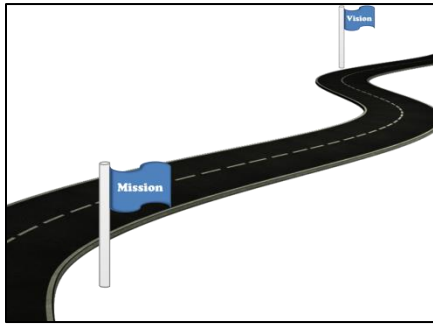
Q: What does the mission statement provide to a process system/improvement initiative? A: General guidance and *context*. Here are some simple mission statements:

- Amazon: "To be Earth's most customer-centric company where people can find and discover anything they want to buy online."
- American Financial Group: "Our purpose is to enable individuals and businesses to manage financial risk. We provide insurance products and services tailored to meet the specific and ever-

changing financial risk exposures facing our customers. We build value for our investors through the strength of our customers' satisfaction and by consistently producing superior operating results."
- Lockheed Martin: "We solve complex challenges, advance scientific discovery and deliver innovative solutions to help our customers keep people safe."
- Internal corporate IT function: "To provide strategic IT vision, leadership, and enterprise solutions to the staff so they can meet their goals, deliver results, and enhance the company's position in the US and global markets.*"*

Capturing a **Vision** gets us even closer to the purpose of our process efforts. A vision statement paints a picture of the future. It is a vivid description of the *envisioned* organization as it effectively carries out

its mission; how it will operate and what it will look and feel like once it has achieved the goals of the initiative. It characterizes how people will get their work done efficiently and effectively, how they will meet cost, schedule, quality, and customer requirements, and how they contribute to the organization or departmental mission. This vision commonly represents the top level requirements for the process system in that it often communicates something about the transformation that needs to take place and alludes to certain capabilities that the process system must support. If pulling a vision into focus is foreign territory for you, books such as *Leading Change* by John Kotter are a helpful read.

The "vision thing" may be hard for some people, particularly technical types. Executives and process improvement leaders may have difficulty "envisioning" an improved way of getting work done in the future. But, when vision finally "clicks in", process definition and improvement initiatives are able to maintain focus and achieve real improvement in how work gets done.

A good way to help people develop a vision is to start by focusing on points of pain and suffering! If your initiative is a response to past mistakes, poor performance, or because of a current burning platform[2] then you are in luck! That may sound crazy, but nothing fuels and motivates an initiative better than pain and problems! This approach may benefit from some investigation. If you don't know the whole story of a recent disaster in the organization, or are not sure of all the nuances of recurring problems, ask around. Ask at all levels, from executive management through line workers. Ask your sponsor. Ask people who are known for plain speaking rather than political correctness and platitudes. Ask people who are not afraid of failure, who are motivated to fix things, not cover them up. Here are some examples of pain and suffering that have fueled process initiatives over the years:

- high or unexpected costs, costs overruns, margin losses due to mistakes, inefficiency, rework
- schedule slips, inability to deliver on time, missed market window, slow responsiveness

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[2] As a process improvement advocate, it's always wise to know where common organizational change leadership concepts come from. To read more about the origins of "burning platform", click here.

- customer dissatisfaction, poor quality, recalls, failing to meet customer/contractual requirements, missed customer/market needs, reputation, lack of customer confidence, little repeat business
- employee frustration, high turnover, lack of communication/cooperation, organizational silos, improper hand-offs, lost opportunities

Problems and pain are fodder for a process initiative. Another form of fodder is the *risk* that your "platform" is about to catch fire. Small organizations which are starting to grow may not yet have experienced much pain, but sense the possibility of a tsunami on the horizon. So, capture both management and staff observations and burning platform stories in writing. Make sure, while you are documenting these, to note how the horror stories and concerns people are expressing relate to the business and the processes you plan to capture. From problems and pain comes a vision of a future free of pain.

Participants from organizations which have succeeded in transforming how work is done often share *before* stories of the pain experienced prior to processes being formalized and/or improved practices introduced, then proudly share how great the *after* state looks and feels. Here are some examples shared during CMMI ML3[3] appraisals.

Before Stories:

> *"I like pizza, but not every night! I am sick of firefighting mode as the norm"*
> *"I'm not really sure about my role vs. xxx. We often miss things…"*
> *"I have ideas. But they don't go anywhere – no way to improve how we do things"*
> *"Some groups are seriously inefficient and not service-oriented, but nothing is ever done to change it"*
> *"We don't have (or know of) a mechanism to share and spread good practices"*
> *"Communication and interfaces between the functional teams is terrible"*
> *"We grossly underestimate, then pile on unplanned rework. To catch up, we skip quality reviews and testing, and end up shipping poor quality products. Then spend nights and weekends putting Band-Aids everywhere!"*

After Stories:

> *"Process discipline has significantly improved team communications and product quality"*
> *"The process has provided standardization and a repeatable blueprint of how to transition effectively through the project phases."*
> *"…customer sees improved performance"*

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[3] CMMI is a set of best practices that are adopted by organizations and requires that an organization's practices be captured and followed to create repeatability and predictability. Many organizations who adopt these best practices in service industries, product development, project management, quality management, vendor management, etc. experience significantly improved business results. For more information about how CMMI can help your organization, see http://cmmiinstitute.com/ and our web site.

> *"… All of this results in a higher customer satisfaction."*
> *"Our customers see real progress"*
> *"The process has allowed us to deliver a product with higher quality because we have such an intensive QA process before things leave the building. This in turn increases customer satisfaction."*

Bypass asking and answering the WHY questions only at your peril! Nothing is more fruitless than an improvement program that fails to improve the right things because it failed to bring its purpose into focus!
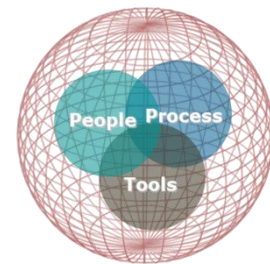
Process System: Interconnected Elements (Process, People, and Technology)

Some people have a mistaken understanding of 'process' and end up with a poor process system as a consequence. They think of a process as a static series of steps or actions, documented in some form such as a flow chart that depicts sequence, interconnection, and decision points that lead to multiple paths or alternate workflows. But this *action* view of process is one-dimensional. It lacks depiction of the *actors* and *tools* used in the process. The actors are process **users,** and the tools are any **technology** used in performance of the process actions. A comprehensive depiction of process includes not only *what* work gets done, but *who* does it (the roles of the actors) and *how* (technology tools or methods utilized.) When the process system provides clear direction as to roles and steps involved in the work, and where and what tools are employed in its performance, then you have something! All three are included in the scope of the process system.

Example of this triad looks like this:

- Process: Develop an annual department budget
- People: Department Head, Leads, Senior Management, Finance, HR
- Technology: Accounting Systems, Budget/Estimation Spreadsheet, Data Repositories (Salaries, Time Reporting, Purchasing)

- Process: Develop and Deploy Software Application
- People: Project Manager, Scrum Master, Developers, Analysts, Testers, Product Owners, Release Manager
- Technology: Project Management Tool, Requirements Database, Workflow Tool, Integrated Development Environment, Testing Tools

All too often, processes are defined in such a way that they lack some of these elements. The process builders wimp out and capture processes at such a generic level that the roles (if mentioned at all) bear no resemblance to reality. The people performing the actual work don't see themselves in the process. Similarly, fearing that technology will change rapidly (and it probably will – get over it!) and mistakenly supposing that process writing is a one-and-done activity, the process builders write vague verbiage that, again, is so high level that it does not resemble the real work and leaves process users scratching their heads as to its applicability.

[In later articles in this series, we will discuss how to employ solid design principles like coupling and cohesion to serve up the right level of detail at the right time and minimize process maintenance. But for now, the important point to remember is: a process system must reflect real people and the actual work environment.]

So, in scoping, we want to identify, at a high level, the processes, people, and tools to be encompassed in our process system. Some questions to answer are:

- What handful of key processes, workflows, or process areas make up the process system?
- Who will use the process system and how will they use it?
    - What geography and/or office locations will use the system and how will they use it?
    - What divisions/departments/teams will use the system and how will they use it?
- What **people** play key **roles** in these processes/process areas, and are their roles clear and consistent?
- What machines, systems, networks, databases, applications, or other such tools support the processes and how are they used?

Representing the Boundary View

The boundary viewpoint serves as a fantastic communications tool and springboard for discussion and clarification throughout your process definition efforts. It can help to get buy-in and develop a shared vision for what the process system is -- and what it isn't. It is a great risk mitigation tool in that it helps to continuously validate that you are staying on track.

What we are talking about is akin to the Concept of Operations (or ConOps) in software and systems design. A ConOps typically answers the questions: who, what, when, where, why, and how for the new or existing system.

Who: Who are the Stakeholders involved with the system?

What: What are the known elements and the high-level capabilities of the system?
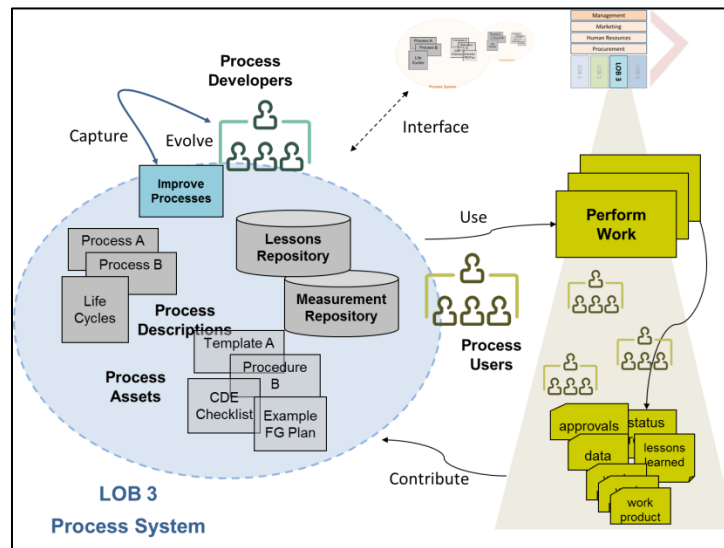
Where: What are the geographical and physical locations of the system?

Why: What does your organization lack that the system will provide?

A ConOps is best represented in pictorial form, with supporting textual detail. (If you haven't seen a ConOps before, links to some are provided at the end of this article.) A ConOps for a Process System is best depicted from the viewpoint of individuals who will use that system – the process users. How does the system help the process user get their work done? The diagram should also delineate "boundaries" between the proposed process system and other systems being used in the organization. The vision statement can serve as a great caption for the ConOps. It is recommended that the ConOps be supplemented with an In-Scope/Out-of-Scope table, and a Current State/Desired State table is also useful.

The ConOps should also describe the environment in which the process system will operate:

- Facilities – where it will be available (office, home, wherever there is internet/intranet)
- Equipment/HW/SW needed to run the system (desktops, handheld, mobile, anything with a screen)
- Support Necessary to Operate the Deployed System – the diagram should depict the group (PMO, EPG) responsible for evolving the Process System over time, for making changes and improvements as the process itself and the organization changes

The diagram above provides a generic ConOps for the Line of Business process initiative discussed earlier. More details are needed, but some of the elements discussed are depicted.

So what does your process system look like from 90,000 feet? Where are its boundaries and what should it interface with? What is the vision for the people, processes and tools are you representing? Taking the time to think about your Process System from multiple viewpoints before you build it may just change what you build and help you build something that gets used!

Appendix: Examples of Concept of Operations for Complex Systems

From the Department of Transportation:

1) The DOT Oregon TOCS System CONOPS – Figure 3.3
   http://tmcpfs.ops.fhwa.dot.gov/cfprojects/uploaded_files/conops_tms_handbook.pdf

From the U.S. Army:

1) LandWarNet Concept Of Operations (CONOPS) – www.tradoc.army.mil/tpubs/pams/p525-5-600.doc Figure 1.2 (Page 7)
2) JIE Operations Concept of Operations (JIE Ops CONOPS) –
   http://ciog6.army.mil/Portals/1/Architecture/2014/20140306-US_Army_NetOps_Reference_Architecture_and_Annex_A-V1-0.pdf Pages 6 & 7

From the F.A.A:

1) The Integration of Unmanned Aircraft Systems into the National Airspace System -
   https://www.suasnews.com/wp-content/uploads/2012/10/FAA-UAS-Conops-Version-2-0-1.pdf
2) NOTAMS System Improvements - https://www.nbaa.org/ops/airspace/issues/notam-realignment/_images/notam-fns-concept-of-operations.jpg