Remote Collaboration Models for Oil and Gas—A Comparison of Asset and Hub Based Models

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Abstract

Innovations in various collaboration technologies are helping companies to make the Intelligent Oilfield (or DOFF) a reality. Core to the Intelligent Oilfield are collaborative environments (or remote operations centres) – a high-tech, communications, visualization, and audio-enhanced monitoring or control room that enable more effective data collection, monitoring, communications and knowledge & information sharing. These environments are designed to help resources make more informed decisions and to take the appropriate actions across the enterprise. In addition, they enable alignment, focus, and a common understanding to help prioritize opportunities.

There are currently two differing philosophies for the implementation of these centres – an asset-based centre that services a single asset; and a central hub model that services multiple assets. Each approach has its own particular merits and potential pitfalls. Although there is no single right answer, certain considerations are recommended before construction begins that could assist in determining the most appropriate approach for the given circumstances. Factors such as corporate culture, employee skill base and complexity of workflows can have a huge impact on the success of the final choice. Without such an evaluation, many efforts will continue to be burdened or opportunities will be deferred or lost.

The paper proposes to look at the circumstances in which each approach has been adopted and consider the pros and cons of each and some of the factors that will influence the design choice.

Introduction

The Intelligent Oilfield (IOF), also known as the Digital Oilfield of the Future (DOFF), encompasses a collaborative environment (CEs) for communication, data collection, reporting and monitoring, and knowledge & information sharing. These environments, or physical workspaces, are intended to help people make more informed decisions and to take the appropriate actions across the enterprise. In addition, it enables alignment, focus, and a common understanding to help prioritize opportunities.

Innovations in various collaboration technologies are helping companies to make the intelligent oilfield a reality. One of the key implementation components currently attracting attention is the collaboration or remote surveillance center – a high-tech, communications, visualization, and audio-enhanced monitoring or control room. Although the facility is intended to create an atmosphere for improved communications, multifunctional work, and a means to help eliminate organizational barriers, the center itself is only the physical manifestation of the desired spirit of richer and increased human interaction.

There are currently two differing philosophies for the implementation of these centers – an asset-based center that services a single asset and a central hub that services multiple assets. Each approach has its own particular merits and potential pitfalls. Although there is no single right answer, certain considerations are recommended before construction begins that could assist in determining the most appropriate approach for the given circumstances. Factors such as corporate culture and employee skill base can have a huge impact on the success of the final choice. Without such an evaluation, many efforts will continue to be burdened or opportunities will be deferred or lost.

Collaboration Center Defined

Webster's dictionary defines collaboration as: 1) to work jointly with others or together especially in an intellectual endeavor, or 2) to cooperate with an agency or instrumentality with which one is not immediately connected. That said, the oil industry has been collaborating internally, such as a business unit with an R&D group, and externally, such as with suppliers, for years. What makes the recent CEs different from the collaboration in the past is the reliance on real-time data and information, with the intent of real-time analysis and decision-making, in a fixed, fit-for-purpose physical space. The degree of real-time action-taking, whether through remote control or other means, is much more variable for CEs, even within the same company.

The collaboration of today is also about interacting for a common goal. The main theme or purpose for installing collaboration centers is for increased "situational awareness" – that is, the expedient understanding in an organization of what it is faced with and how to respond or exploit that particular situation. This alignment can be difficult given the autonomous nature of E&P organizational structures and governance models, combined with the numerous situations that require a globally diverse support network. Therefore, the new CEs not only represent a new physical workspace, but a new operating model that has many unintended consequences.

As an enterprise considers the value of a collaboration center, there are various factors and consequences (intended and unintended) in design, installation, and operation. The center itself is merely the physical manifestation of a spirit of data, information, and knowledge sharing within an organization. It should be noted that the benefits of this collaborative spirit can, ideally, be achieved without the physical space by virtue of well-connected, collaborative workforce. But, the new CEs may be the valuable first step in an evolution that leads towards real-time collaboration anytime anywhere.

Factors for consideration

As organizations strive to improve performance around complex, multi-functional problems and opportunities through the use of the CEs, there are factors to consider prior to design and implementation. These factors have been developed into a simple selection tool whereby practitioners can use it to quickly determine the appropriate bundling of assets that any one CE can support. It should be noted that this tool (Figure 1) should reflect the current state of organization. In the event that the new CE is to be used as catalyst for change in the organization, this tool would need to be slightly modified such that these factors are individually evaluated with an eye towards changes that need to be made to move in the desired direction (see Figure 1).
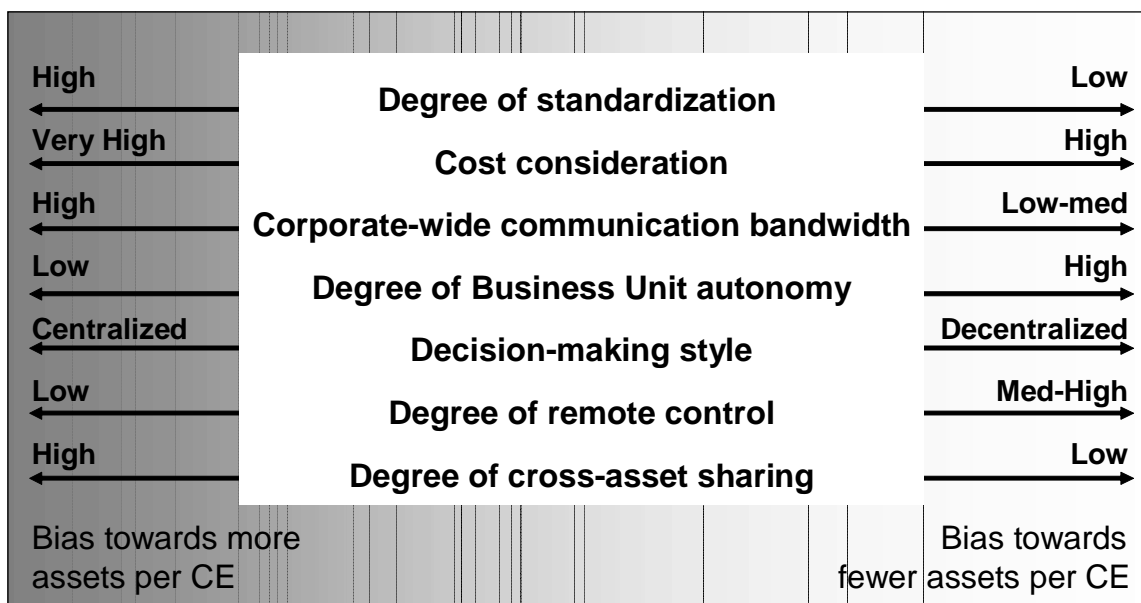
High	Degree of standardization	Low
Very High	Cost consideration	High
High	Corporate-wide communication bandwidth	Low-med
Low	Degree of Business Unit autonomy	High
Centralized	Decision-making style	Decentralized
Low	Degree of remote control	Med-High
High	Degree of cross-asset sharing	Low
Bias towards more assets per CE		Bias towards fewer assets per CE

Figure 1 – Factors affecting Collaboration Environment Scope and Design

The factors are::

- Degree of standardization – the amount of uniformity or commonality of processes and IT tools & infrastructure between business units
- Cost consideration – the sensitivity of the CE implementation to investment size

- Corporate-wide communication bandwidth – the ability to move large amounts of data and information from region-to-region
- Degree of Business Unit autonomy – defining how much each business unit can act on its own
- Decision-making style – the approach that the organization, generally, makes important decisions
- Degree of remote control – the ability and willingness to operate machinery from a distance
- Degree of cross-asset sharing – how much data, information, and knowledge (such as best practices, lessons learned) are routinely transferred between business units and assets

With this tool in hand, project managers and CE designers can tailor the right number of assets that each CE can support. In the extremes, an entire company could ideally have a single CE to service all of its assets. But, a much more common approach is a single CE for an asset, or business unit. Conversely, the many single-asset CEs implies, or reflects, the grading of each factor for those organizations.

Unintended consequences

Once the number of assets for one CE is determined, there are unintended outcomes worth considering. For CEs that support a single asset, the main factors are:

1. *Ensuring the right level of staffing or activity can validate the construction of the CE* – there are ample examples throughout the world whereby production CEs are left fallow for the majority of the day as staff is stretched too thin to support the large number of CEs, or there is not enough work to keep the current staff busy on real-time topics

2. *Integrating the various CEs for a larger benefit (i.e. the bigger brain)* – organizations that choose to develop a single CE for a single asset risk creating yet another barrier to sharing and leveraging new lessons learned and best practices from all assets

No large or major E&P organization has yet attempted to fashion a single CE to support all of its assets or business units. But, there are many that are attempting to support many assets with a single CE. For CEs that support a multiple assets, the main factors are:

1. *Ensuring that there is adequate skill and human capability to be successful in the variety of assets.* One way that a supermajor is addressing this is to bundle multiple, like assets (such as wet tree- and dry tree-based assets) for a single CE to support.

2. *Once this approach is selected, the effects of standardization become apparent.* Without standardization of process and IT tools, the CE can quickly become a Tower of Babel for the CE residents. Staff will be asked to learn each tool and system, creating a daunting challenge. Companies that have genuine standards have a distinct advantage.

3. *Data quality becomes even more critical as the CE residents have less intimacy with each asset.* As the CE starts to resemble a "help desk", churning solutions out with ease, the amount of time spent on each issue may be smaller than current practices afford. As such, CE residents will not have the ability to maintain their data quality assurance role.

Operating Models

As the right data, tools, and talent are collected in the new CEs, decision-making can be radically changed. Whereby current decisions travel in series fashion, the CE represents a change to decisions in series. This simple, but powerful, change is both the explicit outcome (such as Better Decisions Faster tm), but can also be the largest [internal] threat to success. Those in positions of authority can be threatened by no longer being required to inspect the decision process or the decision itself. In more than one example at a supermajor, this is becoming evident as new leaders enter into the CE and find themselves in a very different role than other leadership roles. Each new leader also poses a risk for the entire CE in the event that they cannot adapt to the new decision processes.

The concepts of accountability and responsibility are also in need of re-definition in the new CEs. As the CE residents are typically multi-functional or multi-discipline, roles and contributions can shift from problem-to-problem, blurring what are normally clear roles and responsibilities. Additionally, for those companies looking to increase their ability to remote control equipment, the role of the on-site personnel will need re-evaluation. Regardless, a strong working relationship and rapport between the functional expert and the particular location or "recipient of support" is a critical success factor. This involves

the establishment of a level of trust between the field personnel and the technical staff – and must be accomplished on location, i.e. in the field.

Conclusion

When a company formulates a strategy for CEs for its business units, it reaps what it sows. Some E&P companies do not realize the transformational nature or impact of implementing collaboration centers and therefore do not realize the aspired benefits. Fundamental changes in "how people work" are often not understood. And organizational models are sometimes not viewed or considered as important as the technical solutions or the technology itself. Although this view is justified as the technology component is certainly where the high dollars are spent, it is not where the greatest value is derived. The true value lies in the ability to match the asset / CE ratio with other factors in the business to attain cultural alignment. This alignment is a key driver, and possibly leading indicator, of successful benefits realization.