ESS and ITS Vision

IRC Position Paper – Draft 1.1

Feb 2, 2004 - Andy Rodriquez

The movement of the industry toward the adoption of the Functional Model puts us at a unique time in the industry where significant change can be made. However, it is also a time where, if not carefully managed, that change can become chaotic. Worse, if the change is not undertaken with diligence and care, it can result in the further entrenchment of inefficiencies and flaws.

As such, it will be critical over the next few years to properly shepherd these processes. A vision must be identified, embraced, and championed to ensure that appropriate goals are met as the industry moves forward. To that end, this document attempts to describe a general philosophy for implementing industry-wide tools over the course of this transition such that a consistent vision can be understood and held by the industry at large.

A key step in understanding this approach is understanding the current limitations, flaws, and weakness of the existing systems under which we operate. Today, there are several steps in the energy scheduling process:

- Trading/Transacting – the actual purchasing and selling of energy positions at specific locations (either as speculation or as part of serving load)
- Scheduling – the booking out of positions and the eventual determination of schedules that must be implemented as physical transfers
- Purchasing Transmission – the procurement of transmission rights across the interconnected network to support schedule flow
- Scheduling Generation – the arrangement of the actual increase and decrease in generation to effect interchange
- Tagging – the process of documenting and approving the transaction for the purpose of congestion management

Traditional NERC tagging covers the final of these steps – but does so in a way that is difficult and unwieldy. As RTOs expand and become more prevalent, this problem will be reduced to some extent. However, a fundamental need to understand inter-regional transfers remains an issue that must be addressed. Further, the current solution offered by several providers (schedule from the tag) introduces a dependency on a tool that, while the best tool available to date, can be significantly improved. Additionally, this solution does not address any of the other steps of the scheduling process, which leaves the marketplace struggling to keep up with the fast pace of energy scheduling.

Some of the key areas where flaws occur are as follows:

- The transfer from Deal Capture to the Scheduler. As transactions are consummated (both energy and transmission purchases), contract references and other identifying information is exchanged. If this information is corrupted (either miskeyed or simply incorrect), the deal information is invalid and transactions may not flow.
- The exchange of data between one Scheduler and another. As scheduling occurs, the same information described above is exchanged via telephone, e-mail, and instant messaging clients. Again, if the information is corrupted in some inadvertent fashion, the deal is in jeopardy. Further, the time required to exchange this data can be significant.

- The duplication of data and effort. The use of separate energy scheduling systems, transmission sales systems, and tagging systems results in much of the same information being entered over and over in different systems. This results in larger and larger lists of tasks as part of the scheduling system, eliminating the time to accomplish a growing list of tasks. A mistake in any one system can jeopardize the entire transaction.
- The "just in time" approval of transactions. Under the current mechanisms, it is impossible to get approval of a transaction prior to its submission for implementation. As such, there is very little time to correct mistakes if they are found, increasing delivery risk to the marketplace.

Having identified these weaknesses, we can identify a solution that can eliminate them. As technology has changed over the past decade, more and more tools have been developed to address these problems in other industries. By leveraging some of these solutions, we can mitigate these problems and improve the overall agility of the marketplace.

The first step in the process is to develop a system that ensures that data can be guaranteed to be uncorrupted. This can be accomplished through the use of various mathematical approaches, such as Cyclical Redundancy Checks (CRC) or hashes. By adopting a technology based on these principles, the industry can eliminate the possibility of miskeys and typographical errors halting business.

The use of digital signatures to verify the authenticity and veracity of data can address several of these weaknesses. Rather than attempt to retype the same number over and over again, traders and scheduler can simply use signed copies of a number without fear of miskeys. For example, instead of getting an OASIS number from a node when transmission is purchased, a buyer might get a signed data object that describes the reservation itself. The signature guarantees that the description cannot be changed, and ensures the buyer that the transaction is legitimate. From a scheduling perspective, counterparties could simply exchange objects (or references to objects) rather than entering transaction data in emails or other messaging tools.

Using data objects and digital signatures can eliminate a significant portion of the problems described above. Signatures themselves can ensure accuracy; by abstracting the data into objects (as opposed to displays), the visual interface requirement (reading what's o the screen, then typing it into another) can be eliminated. Even entering the data into multiple systems can be eradicated by making the data object itself a self contained object that doesn't necessarily require copies being made of itself in order to be utilized.

The remaining problems to be solved, then are the necessary interactions between schedulers to coordinate scheduling information and the nature of the approval process. Both can be addressed through a more distributed approach to transaction assembly. Under the current models, multiple transactions are effectively required to be known in their entirety by at least one party; possibly more. That party then assembles the various components of each transaction to create a final schedule, which is then distributed too all parties for approval.

Rather than perpetuate this model by embracing the existing systems, a new model that involves a more "peer to peer" oriented approach and can mitigate this problem should be pursued. To that end, a system that retains the "regional flavor" of various RTOs yet allows for a seamless interface between areas should be the ultimate goal. This will help ensure optimal efficiency from the marketplace and at the market/reliability interface, while at the same time allowing for significant regional diversity to address local concerns and/or permit differing market designs. Using the strategies and technologies above, combined with flexible standardization offered using modular eXtensible Markup Language structures, this vision can be achieved in a manner that is cost effective, scalable, and allows for regional diversity.

As a plan for moving toward this goal, the steps below highlight key actions that should occur to make this vision into a reality. Initially, the focus is on transitioning from NERC to NAESB. However, the key point for the future is a clear division of labor, which will ultimately allow rapid progress and development.

1.) NERC and NAESB come to agreement on if and how the E-Tag system (including the IDC) will be maintained until it is replaced by OASIS Phase II.

   a. NERC will "own" the E-Tag Specification, Policy 3, and Policy 9.

   b. Changes to E-Tag, Policy 3, or Policy 9 will go to the JIC for assignment to NERC or NAESB.

   c. Whatever group is assigned to examine the changes (NERC or NAESB) will write a proposed change and associated business or reliability case.

   d. That change will then go through a review by the other party (NERC will review NAESB changes, NAESB will review NERC changes, the IRC will review both groups changes) to ensure there are no unforeseen reliability or market problems.

   e. Once all JIC parties have confirmed the solution is correct, it will be sent to the IS and/or ORS to implement. To the extent changes are needed to the tools themselves, the IS and/or ORS will forward such changes to the TISWG and/or IDCWG as appropriate.

2.) NERC and NAESB agree that OASIS Phase II and Electronic Scheduling will be divided into two parts.

   a. The Market Scheduling portion, which will include PSE interaction, transmission sales, energy sales, pre-approvals, and the mechanism to send a schedule to an IA; and

   b. The Operations Scheduling part, which will include the IA to receive the schedule, confirmations with BAs and TSPs, RA review, and all the other operational components of scheduling (including a mechanism for assigning relief obligations).

3.) NERC will create a group called the Operations Scheduling Working Group, which will develop the functionality described in 2b.

4.) NAESB confirms that the ESS, in designing OASIS Phase II, will be responsible for item 2a.

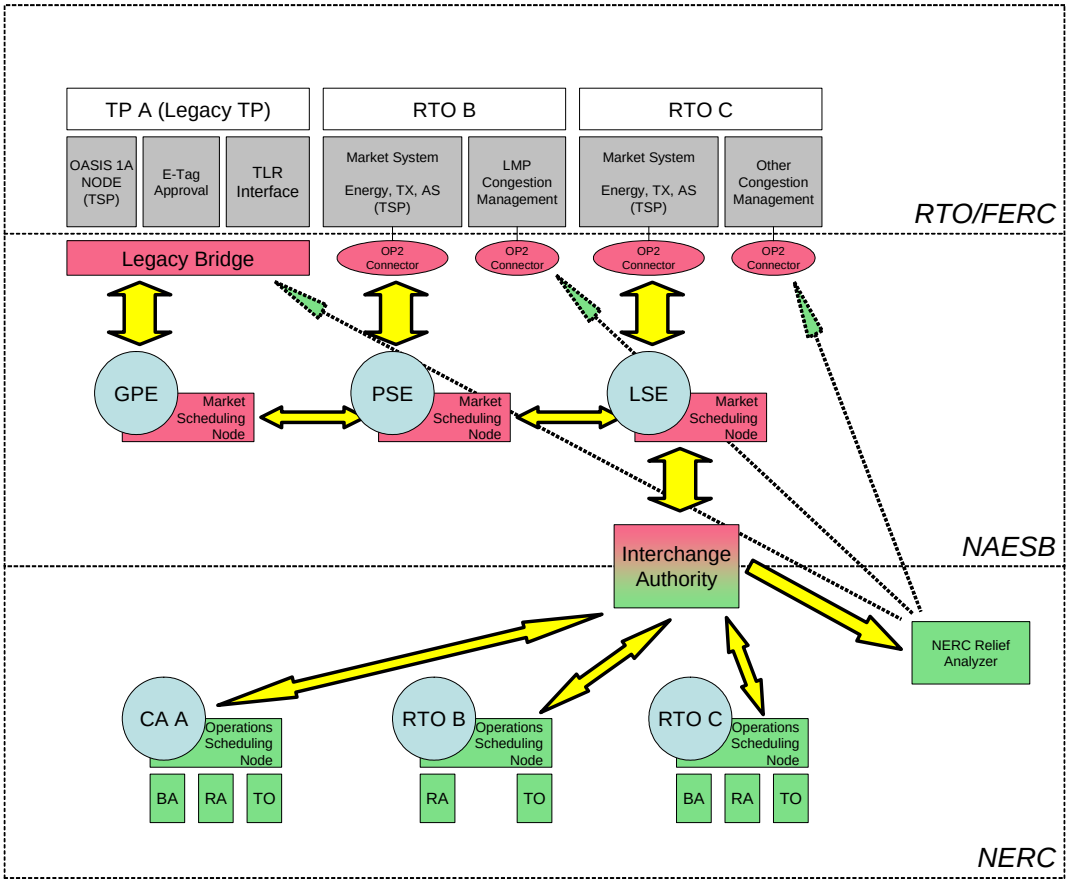
5.) Both groups agree to develop open software standards to encourage vendor competition and robust software markets. Neither group will select a specific vendor or provider (with the possible exception of choosing a standardized message bus provider).

6.) NERC and NAESB agree to implement these two mechanisms in a coordinated fashion.

7.) NERC and NAESB agree that in the future, NERC standards will apply to Operations Scheduling and NAESB Standards will apply to Market Scheduling. Regional Business Practices (scheduling deadlines, product offerings, congestion management, etc…) will remain with the RTOs/TPs.

The diagram below illustrates an potential end-state for the industry with regard to OASIS and scheduling. This end state would allow for the continued existence of E-Tag and OASIS Phase I systems to support areas which have not formed RTOs, but would encourage transition to the

newer systems to support more enhanced capabilities. Eventually, E-Tag and OASIS Phase I systems would be eliminated and replaced with pure OASIS Phase II elements.



Items under the scope of the RTOs, ISOs, Transmission Providers, and the FERC are displayed in grey at the top level. To the extent providers wish to continue to use existing systems, such as E-Tag, OASIS IA, and TLR, the system will allow them to do so.

Items shown in red are under the purview of NAESB. NAESB will define the interactions between the FERC-regulated marketplace and the market. Providers that wish to maintain existing systems will do so via a NAESB-standard legacy bridge; other entities that wish to be OASIS Phase II compliant will be expected to develop interfaces into their systems directly using NAESB-standardized protocols. However, both IA and II compliant systems will retain their ability to offer customized graphical user interfaces as well.

With regard to market participants, the use of NAESB-compliant Market Scheduling software will be required. This software will interact with both market systems (OASIS Phase II nodes, Legacy Bridges, and other Market Scheduling nodes) and the market-facing side of the Interchange Authority.

Finally, items in green represent reliability portions of the model. The Interchange Authority will provide data to all the appropriate reliability functions under the NERC functional model. Relief request will come from the Relief Analyzer (the next generation IDC) and allocate relief obligations back to the appropriate RTOs. RTOs are then free to utilize whatever methods they deem appropriate to effect that relief.

The industry remains at a critical time in its maturation. The vision and steps above will guide the industry toward a robust architecture that allows for regional diversity while ensuring reliable operations and efficient transfers of energy from region to region. With careful steps focused on constant improvements that enhance not only reliability but markets, the success of OASIS Phase II and electronic scheduling will greatly improve the functions of reliability management and interchange coordination. Together, these functions will help ensure the development of robust energy markets that can meet the changing needs of the energy marketplace today and in the future.