R04007-Attachment 1

Electronic Scheduling Collaborative

OASIS II
System Requirements

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Background

OASIS is the Open Access Same-Time Information System. It is a Federal Energy Regulatory Commission (FERC) mandated system through which the electric industry shares transmission information. In addition to FERC-jurisdictional entities, many non-jurisdictional entities throughout North America also use OASIS. Currently, OASIS Phase IA supports only the procurement of physical transmission rights and the posting of various types of information.

In addition to the use of OASIS IA for transmissions reservations, various proprietary market systems are used throughout the industry for procurement of energy and capacity and for scheduling. The E-Tag system is used to support reliability processes in many areas of the US.

These independently developed systems use different processes and data structures. This causes incompatibilities in the exchange of data. It also necessitates redundant data entry or numerous electronic interfaces if multiple markets are spanned. Regional and market differences also contribute to this problem.

The need for a common electronic scheduling system has long been acknowledged by the electric industry. Recent developments, such as the FERC Standard Market Design (SMD) Notice Of Proposed Rulemaking (NOPR), demonstrate the need for a common system capable of supporting energy markets with various market rules. OASIS II will address these needs.

Scope

For entities that operate in the electric utility industry, OASIS II is envisioned to be a standard interface between market participants and market operators and/or transmission service providers. This standard interface will facilitate the trading and scheduling of energy, transmission, and ancillary services between marketing entities (Purchasing/Selling Entities (PSEs), Load Serving Entities (LSEs), Generation Providing Entities (GPEs), etc…), operating entities (traditional Transmission Service Providers (TSPs), Balancing Authorities (BAs), Regional Transmission Organizations or Independent Transmission Providers (RTOs/ITPs), Independent System Operators (ISOs), Market Operators (MOs), Generator Operators, etc…), and any grouping of the two. Unlike current processes, OASIS II will provide a seamless method for interacting with other entities and for scheduling energy, transmission, and ancillary services, regardless of region, type of entity, or market structure.

OASIS II is envisioned to support both physical and financial markets and to be a standardized interface to be used between market participants and market operators that will:

- Facilitate Procurement of Energy & Ancillary Services
- Facilitate Procurement of Both Physical and Financial Transmission Rights

- Facilitate Electronic Scheduling
- Accommodate Regional Diversity
- Ensure Reliable Electric System Operations
- Accommodate Market Operations
- Support Market Monitoring

Facilitate Procurement of Energy and Ancillary Services

OASIS II will provide mechanisms for submitting energy offers and bids for Day Ahead and Real Time markets. These energy products may include both energy and certain ancillary services (e.g. operating reserves and regulation).

Facilitate Procurement of Both Physical and Financial Transmission Rights

OASIS II will provide mechanisms for procuring either financial or physical transmission rights and facilitating secondary markets for trading those rights. There will also be a mechanism for tracking transmission rights that have been obtained outside of OASIS II.

Facilitate Electronic Scheduling

OASIS II will provide mechanisms for scheduling energy and ancillary commitments concurrent with their procurement. It will also accommodate the entry of schedules for energy or ancillary commitments that were procured in non-OASIS markets.

Accommodate Regional Diversity

OASIS II should implement common business models when appropriate, but allow for both regional and market diversity and innovation. Various time frames, congestion management schemes, ramping rules, ancillary services, and uses of resources must be allowed. OASIS II should also support various market models for the trading of transmission and energy, but in a manner that allows for exchange of common data to eliminate input redundancy.

Ensure Reliable Electric System Operations

OASIS II must provide adequate information to support timely reliability analysis and operational management of the electric grid. OASIS II must provide for automated data exchange in order to provide accurate and up-to-date information allowing entities the capability to evaluate the state of the electrical system.

Accommodate Market Operations

OASIS II must provide adequate information to support a variety of market operations. This includes provision of automated data exchange to analyze offers and bids, to calculate LMP, determine resource adequacy, process reservations, calculate ATC, etc.

Support Market Monitoring

OASIS II must provide the capability for access to and viewing of data by market monitors. Market Monitors may also require access to data that will not be provided by OASIS II, such as proprietary transaction information, or may require immediate access to data that may not immediately be available on OASIS II.

Document Scope

Two documents define OASIS II Requirements. These are the System Requirements document and the Use Case Specification.

System Requirements Document Scope

This document is a high-level requirements document that addresses the global factors needed for OASIS II such as usability, architecture, interfaces, reliability, performance, etc.

Use Case Specification Document Scope

The Use Case Specification contains the detailed functional requirements and describes the functionality needed in OASIS II to implement both financial and physical markets for transmission, energy, and ancillary commitments. The Specification will include detailed diagrams and descriptions of business logic and process flow. The Specification will also help to identify business practices that may need standardization. The Use Cases are intended to provide both a foundation and a design tool for carrying

OASIS II forward, but do not include implementation details, such as standard message formats, that will be required to implement OASIS II.

Business Practice Standardization

The OASIS II system and supporting data structures will be designed to be as flexible as possible in order to accommodate various regional and market differences. However, this will not eliminate the need to standardize certain key processes, nomenclature, or business practices. Areas that should be considered for standardization will be identified in the Use Case Specification. The appropriate standard setting organization will be expected to consider and subsequently establish any necessary standards.

Assumptions and Dependencies

An appropriate technical working group(s) will need to develop a Standards and Communication Protocols Document (S&CP) based on the OASIS II System Requirements and OASIS II Use Case Specification. This development should be done using an open industry consensus process. The S&CP will ultimately need to be filed with and ruled on by the FERC.

An appropriate working group will need to take ownership of and maintain the System Requirements and Use Case Specification. They will need to be available to the technical working group to answer questions and make any necessary changes to these documents.

An appropriate group will also need to be responsible for providing a source for authorized market participant data, similar to the current NERC registry.

The System Requirements and Use Case Specification define OASIS II but do not set standards. However, there is a close relationship between the industry standards and OASIS II. The appropriate standards setting entities will need to coordinate with the working group(s) to develop standards.

For the foreseeable future, we believe that various hybrid physical and financial markets will continue to evolve and will need to be accommodated by OASIS II.

Functional Requirements

The functional requirements are defined in the OASIS II Use Case Specification. The Use Cases depict and describe the interactions between the various entities involved with the purchase and sale of wholesale electric energy and ancillary services and the acquisition, whether explicit or implied, of the associated transmission services.

The Use Case Specification is comprised of seven major functional categories. These are:

1. Registration
2. Operations
3. Transmission Rights Market
4. Day Ahead Market
5. Real Time Market
6. Bilateral and Self Schedules
7. Coordination

The Use Case Specification contains information on how to understand the Use Cases along with both overview and detailed descriptions of each Use Case.

Non-Functional Requirements

Non-Functional Requirements describe items that are important to the systems development, but are not necessarily related to a specific OASIS II function.

- Usability Requirements
- Reliability Requirements
- Performance Requirements
- Security Requirements
- Supportability/Maintainability Requirements
- Flexibility Requirements
- Data Requirements
- Audit Requirements

Usability Requirements

Usability Requirements describe those items related to the ease-of-use of the system. They are typically related to Functional Requirements, but do not define the functions themselves.

- OASIS II should allow all entities to respond to evolving market or system needs as soon as practical.
- Duplicate data entry should be eliminated.
- OASIS II systems should have a consistent user interface where applicable.
- Interfaces should have consistent nomenclatures and navigational paradigms from provider to provider, but not at the expense of innovation or functionality. Common nomenclature must not restrict the use of multiple languages (English, French, Spanish, etc.) that may need to be used in some regions.
- Interfaces should be designed to provide regional diversity without compromising the consistent interface.
- Interfaces should be designed to hide complexity from the users to the extent possible.
- Interfaces must be designed around the needs of the business entity (marketers, operators, etc…) using OASIS II.
- Time will be represented in UTC but displayed in a time zone of the user's choice.
- OASIS II must provide automated interfaces with other systems such as E-Tag, non-OASIS scheduling systems, LMP engines, settlements systems, etc.

Reliability Requirements

Reliability Requirements describe the needs of the system with regard to up-time and continuous operation. OASIS II systems must be reliable. Hardware and software systems must exist to ensure that the OASIS II system is consistently available. Systems must be standard compliant, tested, and correctly implemented prior to being allowed to participate as an OASIS II system. Systems must also provide secure communications to ensure both the integrity of data exchange and positively identify scheduling participants.

- OASIS II systems must be available 24X7.
- Automated backup systems and procedures must be provided. The design of the systems must support different failover strategies, from redundant live failover to manual failover processes.
- Data exchanges will use appropriate protocols to ensure reliable communication.

Performance Requirements

Performance Requirements describe the minimum transaction processing times required.

- OASIS II systems should have measurable, adequate criteria for determining performance.
- The performance of OASIS II systems should be high enough that they do not hinder any entity from performing any function supported by OASIS II.
- System performance and sizing should be set high enough to accommodate projected increases in usage.

Security Requirements

Security requirements describe the needs of the system for privacy, authentication, integrity and non-repudiation.

- Privacy: Messages must be private among communicating parties.
- Authentication: It must be possible to determine with whom you are communicating.
- Message Integrity: It must not be possible to tamper with messages during transit.
- Non-repudiation: It must not be possible for a party to deny having engaged in the transaction or having sent the electronic message.

OASIS II must use the appropriate security standards adopted by the electric industry.

Supportability/Maintainability Requirements

Supportability Requirements describe how the system can be expanded upon or maintained. OASIS II must:

- Use a modular and configurable design, so that business changes need not mean a complete system redesign.
- Be data driven to the extent possible so that business rules need not be hard coded
- Allow for the simultaneous support of multiple versions of data exchange protocols so that different entities may phase in upgrades at different times.
- Allow for system upgrades without requiring extensive downtime.

Flexibility Requirements

OASIS II will require a flexible architecture that can support several different market models across a common communication mechanism, providing for regional diversity while at the same time allowing for increased efficiency through consolidation.

- OASIS II must accommodate regional diversity.
- OASIS II must allow for variance of business rules between market operators while providing a consistent interface.

Data Requirements

Data requirements describe general requirements for the data model used for OASIS II.

- The data model should use elements of existing standard data models where appropriate.
- The data model must support variances in scheduling granularity.
- The data model must support variances in locational granularity, allowing for varying uses and definitions of regions, areas, zones, hubs, etc.
- The data model must support variances in business rules for diverse market structures.

Audit Requirements

OASIS II must provide an audit mechanism to track all actions performed. This entails providing change history data with authorship information. OASIS II must also provide historical data storage and retrieval capabilities sufficient to meet audit requirements specified by the industry or regulatory agencies.

Architecture

The following are the foundation technologies that should be used to implement OASIS II:

- TCP/IP
- HTTP
- SSL
- PKI
- XML/XSD (Schema)
- SOAP
- Web Services Architecture

Rationale for foundation technologies:

It is expected that the implementation of standardized OASIS II systems will require that the communications between the various systems will be done on a homogeneous

basis using a consistent communications format and data exchange model. OASIS II should be designed so that various functions are separated into modules, allowing market participants to select modules from a variety of vendors. The modules must interact through standard interfaces.

In many of the emerging markets, market operators allow market participants to interact and exchange data using the Internet and XML. In addition, electronic tagging uses XML, SOAP, and the Internet for data exchange. The ESC recommends that OASIS II be designed so that the same infrastructure and technology can be used, thus reducing the cost of both development and implementation. This implies the use of XML, SOAP, 128-bit SSL (https), and client certificates (the latter two are required to achieve security). Whichever communications protocol is selected, it should be robust, current, platform independent, and Internet compatible.

The standard market interface should allow any vendor to build interfaces between existing scheduling and/or EMS systems so that users need not be required to enter data multiple times or in different formats. Most vendors will be able to achieve this using XML and SOAP based on a standardized schema.

The architecture must be both hardware and software platform independent.

Implementation

This section describes requirements for initial implementation, upgrades, testing, training, and user documentation.

- OASIS II should be implemented in a phased manner in order to support both phased functional implementation within RTOs/ISOs, and to support phased regional implementation.
- Upgrades to OASIS II should be able to be implemented in a phased manner.
- Complete testing should be performed and passed prior to implementation.
- Testing should include complete functional testing, interoperability testing, and user acceptance testing where appropriate.
- Tests must be independently verifiable. For example, it must be possible to calculate the same net schedule using two different computer systems given the same input data and same calculations.
- Third party auditing of test results should be used as proof of compliance.
- Vendors should be required to provide dedicated test systems for interoperability testing. These systems should be made available during times specified by NERC or NAESB.
- Current user documentation will be provided prior to system upgrades being performed.

- Upgrades should not be implemented until impacted market participants have been given sufficient time to modify back office systems and interfaces. Estimates of “sufficient time” should include normal business hours only.
- Upgrades should not be implemented until market participants have had time to receive appropriate training and review user documentation.