



Item 3:
Committee Education on Control Activities
Subject to ERCOT's Service Organization Control
(SOC 1/SSAE 16) Examination

Allison Atherton, Business Process Controls and Risk Manager

Mandy Bauld, Director, Settlements and Retail Operations

Carrie Bivens, Manager, Day-Ahead Market

Aaron Smallwood, Director, IT Operations

Finance & Audit Committee

ERCOT Public

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Learning Objectives

Agenda

1. **What is a Service Organization Controls (SOC 1/SSAE 16) examination?**
2. **Why is the SOC/SSAE 16 engagement important to ERCOT?**
3. **Different report types and opinions**
4. **ERCOT's audit/examinations and opinions (2002-2012)**
5. **What is within the scope of the SOC 1/SSAE 16 engagement?**
6. **How does ERCOT compare to other ISO's/RTO's?**
7. **Summary**
8. **Panel discussion on DAM, Settlements and IT controls**

Service Organization Controls (SOC 1) Examination

Statements on Standards for Attestation Engagements No. 16 is an accounting standard that is used to measure the control of financial information derived from a service organization.

These examinations are performed by a service auditor to report on controls at an organization that provides services to user entities when those controls are likely to be relevant to user entities' internal control over financial reporting (ICFR).

The result of a SOC examination is a report (which includes an opinion letter from the service auditor) on controls placed in operation at the service organization.

SOC 1 (or SSAE 16) is not a certification. Rather it is a report that can be used by user entities to satisfy their auditors.

Why is the SOC 1 examination important to ERCOT?

1. Market Participants rely on ERCOT's settlements and billing process in their financial activities. The SOC report has been designated by the Securities and Exchange Commission as an acceptable method for user entities to obtain assurances about a service organization's internal controls without conducting additional assessments.
2. ERCOT employs a third party to conduct an examination of the settlements and billing process instead of hosting auditors from each Market Participant to conduct individual examinations. The latter approach would be time consuming and disruptive to certain aspects of ERCOT operations, not to mention less cost effective.
3. Protocols 1.4.3.1 (1) and 8.2 (2)(f) require such engagements be part of ERCOT performance monitoring.

Different Report Types and Opinions

There are two types of SOC 1 reports:

1. A Type 1 report is a “point-in-time” report that does not contain an auditor’s opinion on the operating effectiveness of a service organization’s controls.
2. A Type 2 report is a “period of time” report that normally covers a period of at least 6 consecutive calendar months (minimum recommended by the AICPA) and includes tests of operating effectiveness, thus providing a user entity with a greater level of assurance.

ERCOT provides a SOC 1 Type 2 report to its Market Participants.

Different Report Types and Opinions (continued)

There are three types of opinions:

1. An unqualified opinion (clean opinion) is indicative of a description that is fairly presented and controls that are suitably designed and operating effectively. Users can place full reliance on the report.
2. A qualified opinion, while not necessarily negative, is indicative of a limited scope of examination, failure to achieve control objective(s) or material information that needs to be disclosed to the reader of the report. Users can place full or partial reliance on the report pending the nature of the qualification.
3. An adverse opinion is indicative of a description that is not fairly presented and controls that are not suitably designed and operating effectively. Users typically will not rely on any of the report.

ERCOT's Audit/Examinations and Opinions (2002-2012)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SAS 70	X		X	X	X	X	X	X	X		
SSAE16										X	X
Opinion	U	*	Q	Q	Q	U	U	U	U	U	U

Q = Qualified

U = Unqualified

* In preparation for transition from a Type 1 report (2002) to Type 2 report (2004), a diagnostic evaluation was performed in 2003. Therefore, no report was issued that year.

What is within the scope of the SOC engagement?

ERCOT currently has 19 objectives and 176 controls related to market settlements and billing.

The controls correspond to ERCOT's market functions. They were deemed relevant to:

1. ICFR for Market Participants; and
2. Risks to ERCOT.

Control objectives and areas covered by the SOC 1 examination include:

1. Transaction processing controls

- a) Registration/Qualification
- b) “Market Operations” (DAM and CRR)
- c) Load Profiling, Data Acquisition and Aggregation
- d) Settlement, Billing and Financial Transfer

2. General IT controls

- a) Access controls (Logical & Physical)
- b) Program change management and system development
- c) Computer operations

How does ERCOT compare to other ISOs/RTOs?

Entity	Objectives	Controls tested	Comments
ERCOT	19	176 (reduced 6 controls in 2013)	Settlements and billing management and processing
CAISO	12	63	Excludes registration, credit, invoicing, and cash clearing
MISO	16	172	Excludes registration, credit and financial transfers
SPP	20	105	An energy imbalance and transmission service market
NYISO	24	145	Includes other objectives like regulatory affairs
PJM	31	307	Excludes registration and credit. Includes other objectives like Black Start services
ISONE	65	265	Includes other objectives like market monitoring

Summary

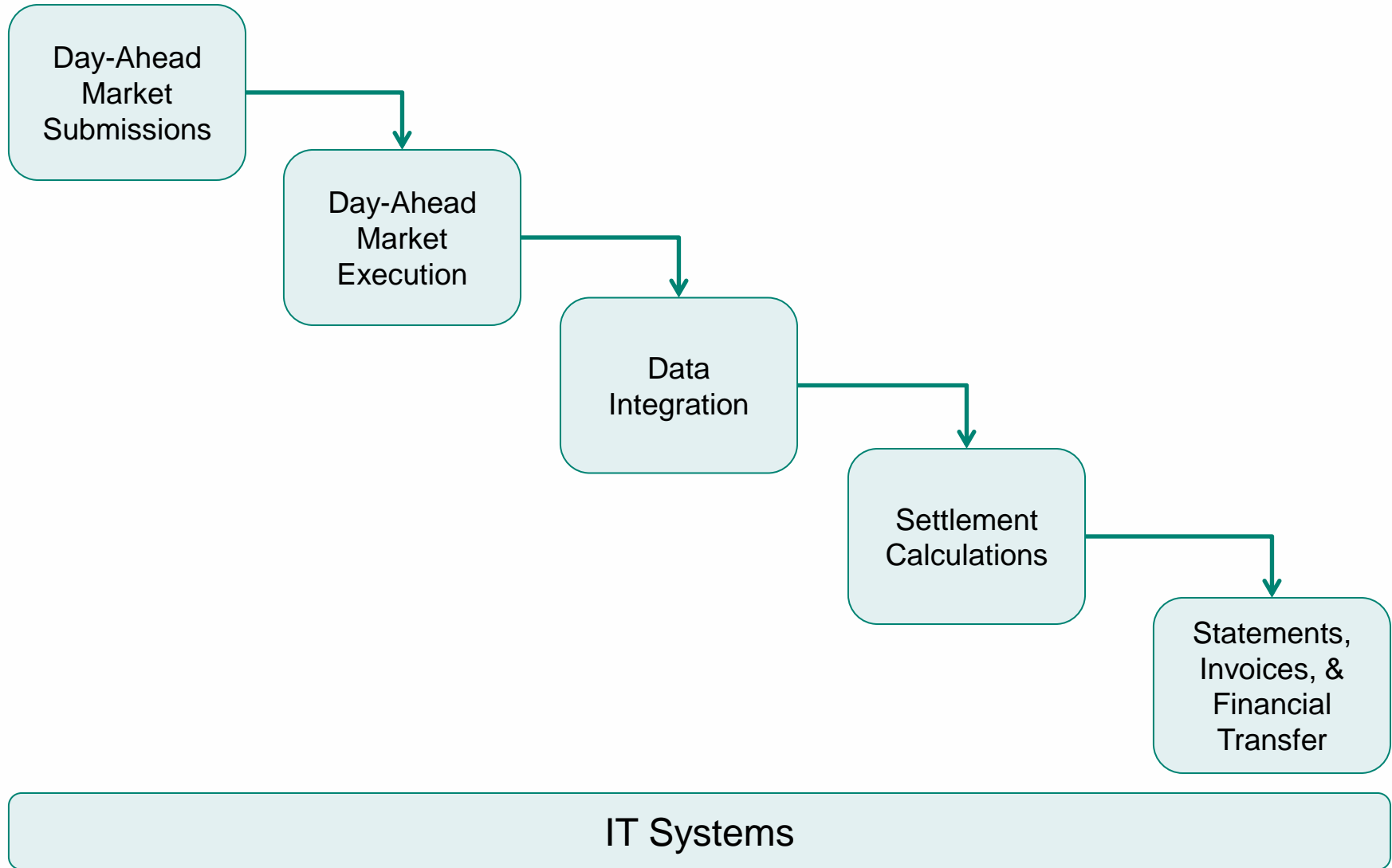
- **ERCOT's Objective:** *Define and implement controls that mitigate the risk of inaccurate and untimely financial settlement resulting in adverse financial impact to Market Participants*
- ERCOT staff, in coordination with PricewaterhouseCoopers and Internal Audit, defined control objectives and control activities (i.e., procedures) prior to the Texas Nodal Market Implementation.
- ERCOT reviews the control objectives and control activities every year and refines as necessary. This process includes working with business process owners as protocols require changes to controls.
- ERCOT staff executes the designed control activities as part of day to day work.
- ERCOT staff supports auditor activities twice a year:
 - Provide data and evidence of controls for a requested sampling of 25-40 Operating Days in the review period
 - Respond to inquiries
- In November, the independent auditor produces a Type 2 SOC 1 report for the review period, which is the previous year October through the current year September.

Panel Introductions

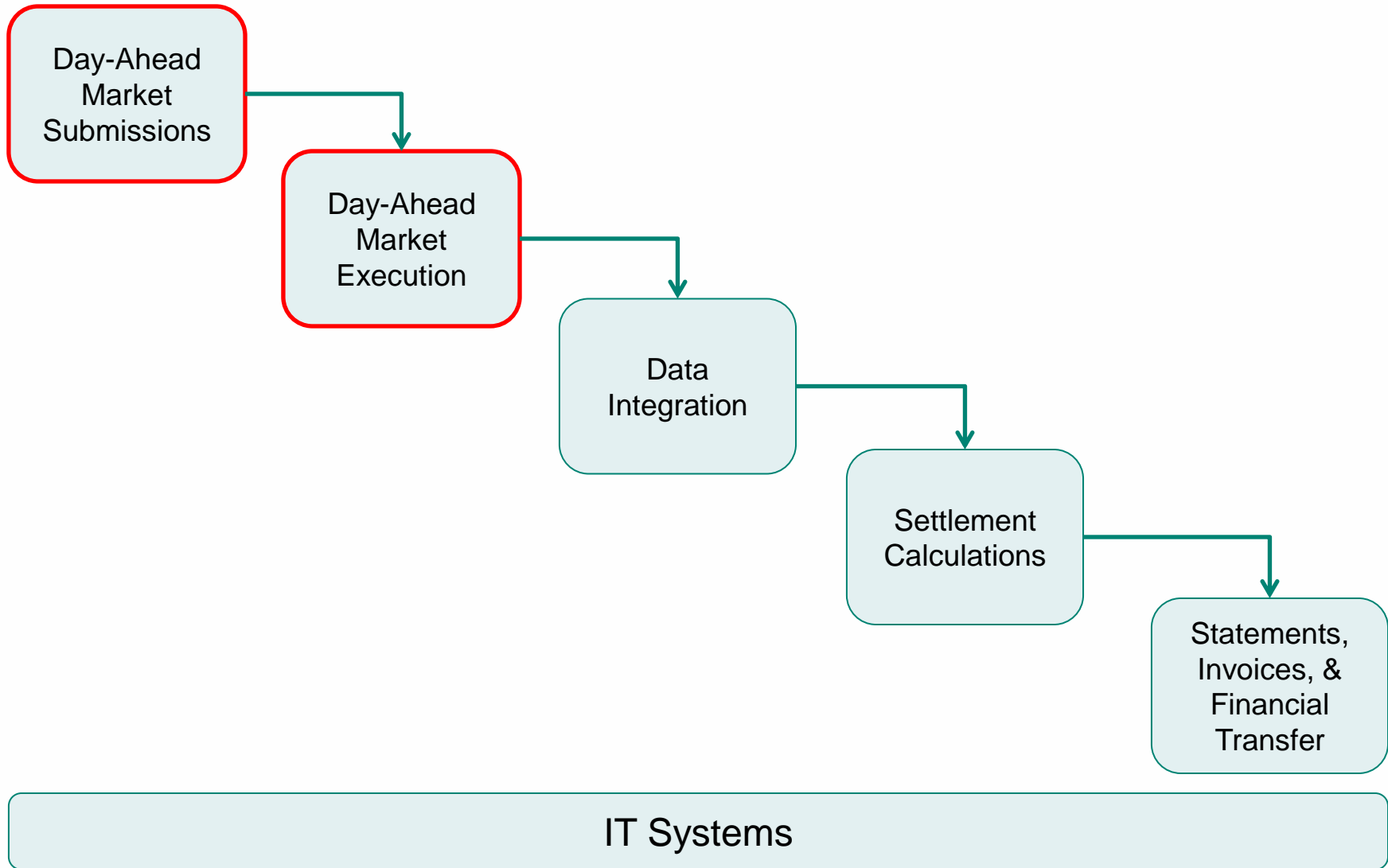
Demonstrate the controls designed and implemented for “bid to bill” of the Day-Ahead Market

- Day-Ahead Market - Carrie Bivens
- Settlements and Billing - Mandy Bauld
- Information Technology - Aaron Smallwood

The Day-Ahead Market: Bid to Bill



The Day-Ahead Market: Bid to Bill



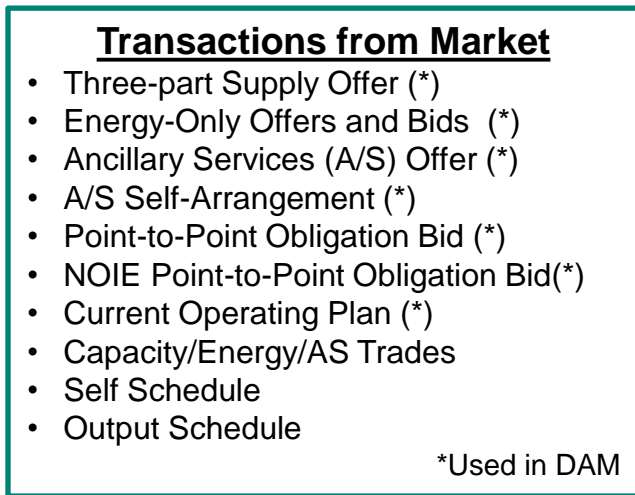
Day-Ahead Market Operations at a Glance

- Day-Ahead Market (DAM)
 - Each day ERCOT clears Ancillary Services, Energy, and Real-Time congestion hedges for the next Operating Day
 - 180 Market Participants enter 175,000 transactions between 7-10am
 - It is necessary to have significant transaction processing controls
 - Daily \$200-900 million dollar bid value is going into the DAM
 - Daily >\$10 million awards per day out of the DAM

Controls for the Day-Ahead Market

- Day-Ahead Market has 5 tested controls
 - 2 controls support accuracy and validity of the high volume of daily market submissions
 - 1 control supports re-verifying historical submissions (T-1 day) for validity based on updated information
 - 2 controls aid in ensuring quality of solution for awards and prices (13,000 prices per day)

Day-Ahead Market Controls



Controls 4.1.1 (API) & 4.1.2 (Web)

Evidence of ERCOT submission confirmation (for both successful and failed transactions, i.e., always a feedback loop to market)

Control 4.1.3

Evidence of ERCOT rejections at 7am re-validation if failed submission due to credit limit, qualification status, or other

Control 5.1.1

Evidence of initial validation tools and confirmation prior to publishing results

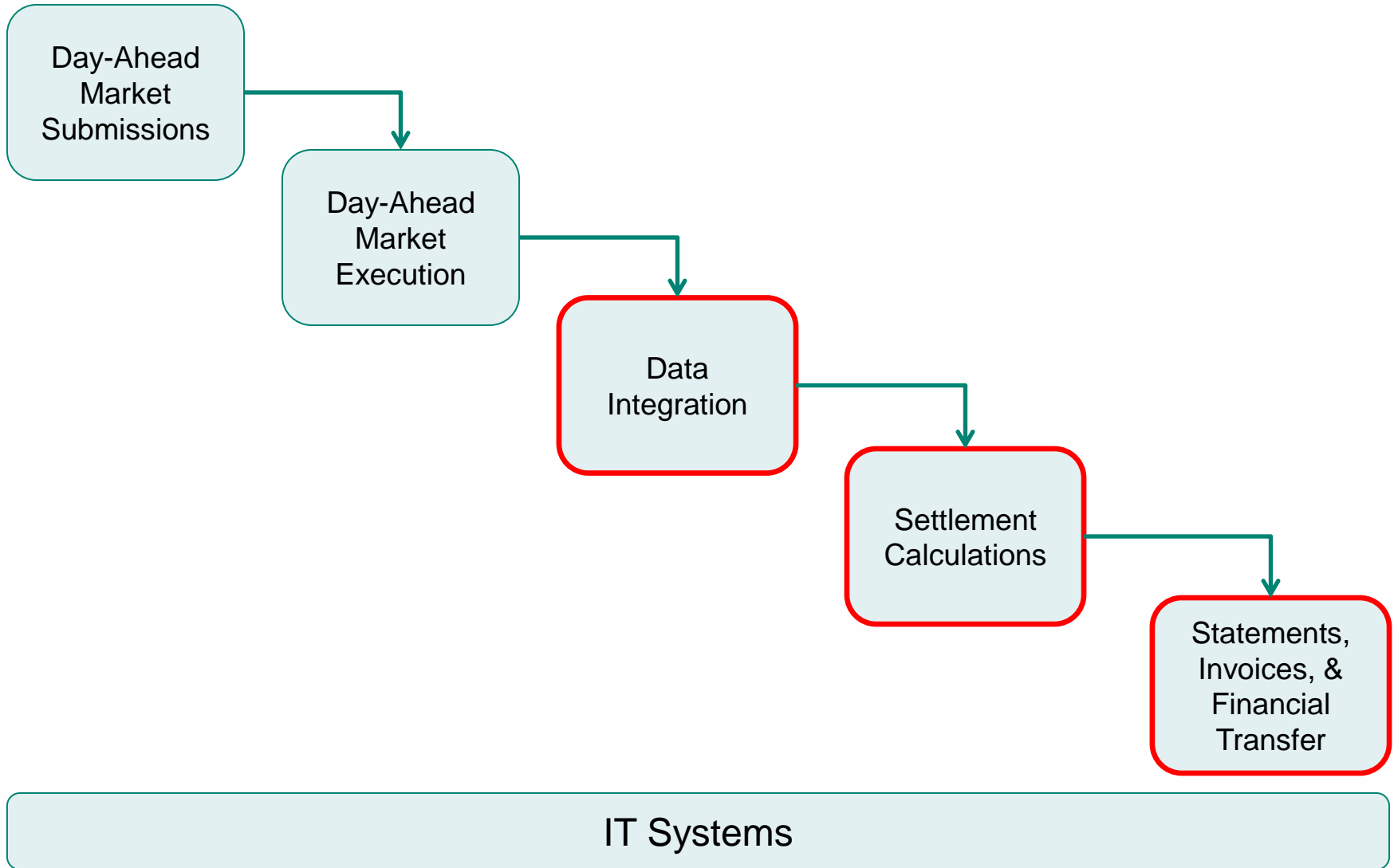
Control 5.1.2

Evidence of final analysis of prices prior to prices being final (Operating Day + 2 Business Days)

Market Participants

ERCOT Settlements

The Day-Ahead Market: Bid to Bill



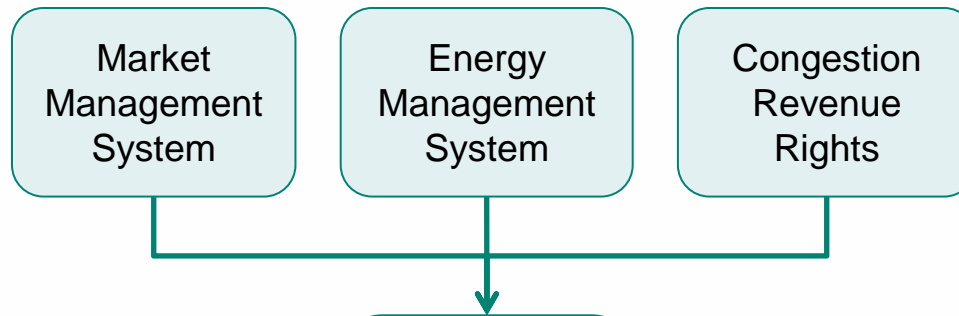
Settlement of the Day-Ahead Market at a Glance

- Day-Ahead Market Integration to Settlements & Billing
 - Over 40,000 transactions processed through integration daily
 - Creates 47 types of data elements for use in DAM Settlements
- Day-Ahead Market Settlements
 - Calculates 19 charge types
 - Produces DAM Statements for over 210 Market Participants
 - Typically settle \$10-14M through DAM for an Operating Day

Controls for Settlement of the Day-Ahead Market

- Staff executes four (4) tested controls for Day-Ahead Market Settlement, which include the following control activities:
 - three (3) control activities to provide reasonable assurance that data used in the settlement process is automatically imported into the settlement and billing system completely and accurately
 - five (5) control activities to provide reasonable assurance that data used in the settlement process is manually imported into the settlement and billing system completely and accurately.
 - five (5) control activities to verify completeness and accuracy of settlement results, statement data, and statement publication
 - two (2) controls activities to verify completeness and accuracy of invoice data and publication

Day-Ahead Market Settlement Controls

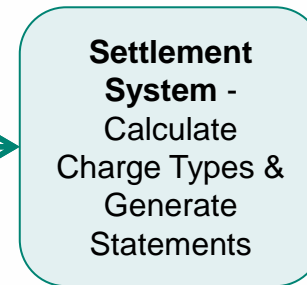
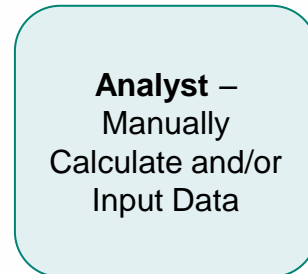


Controls 10.1

Control activities provide reasonable assurance that data used in the settlement process is automatically imported into the settlement and billing system completely and accurately.

Control 10.2

Control activities provide reasonable assurance that data used in the settlement process is manually imported into the settlement and billing system completely and accurately.



Controls 11.1

Completeness and accuracy of DAM settlement statement data, calculations, results, and publication to statement recipients is managed by ERCOT staff and systems.

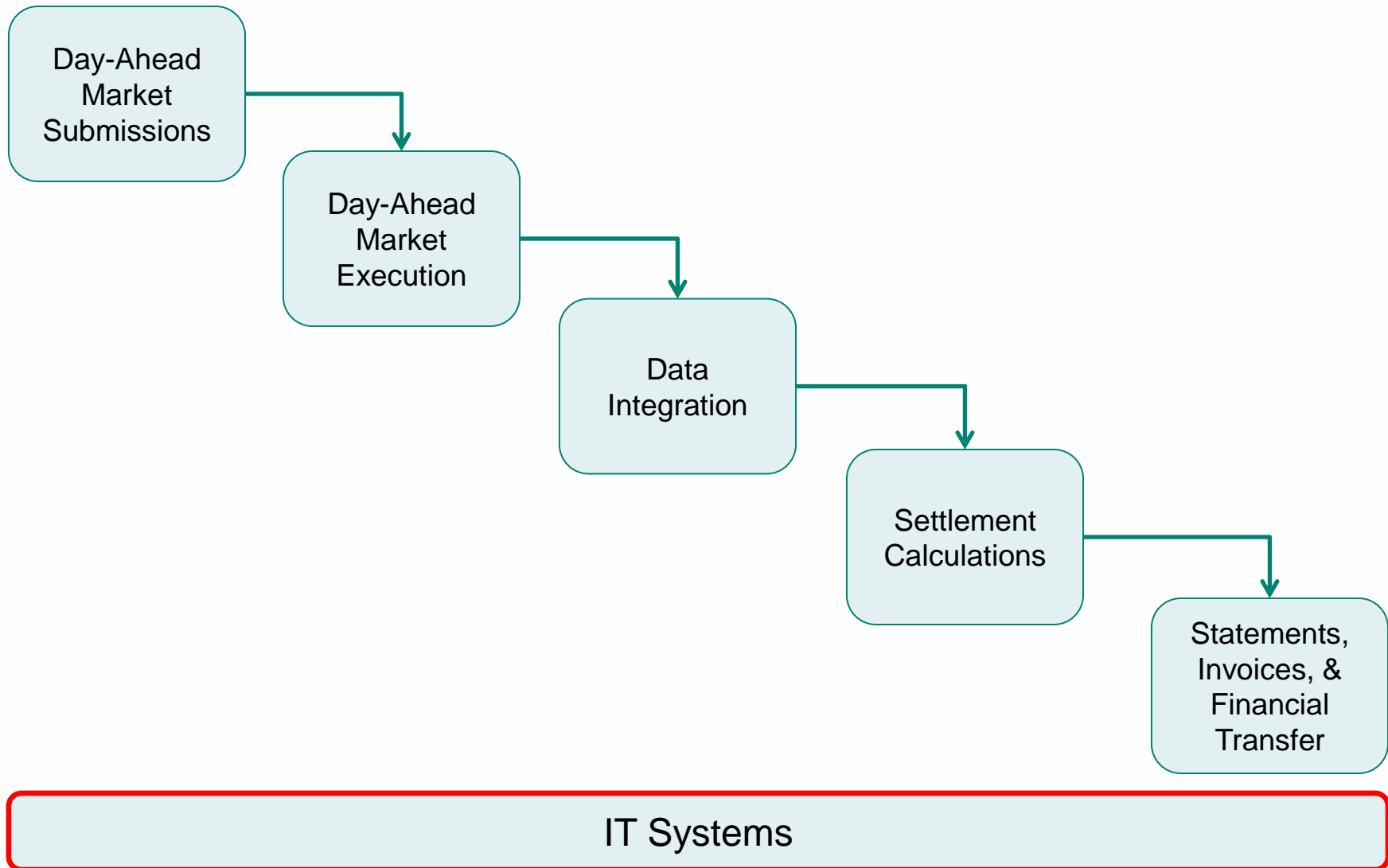
Controls 11.2

Completeness and accuracy of Settlement Invoices and publication to invoice recipients is managed by ERCOT staff and systems.

Market Participants

ERCOT Credit and Treasury

Information Systems Controls:



Information Technology Controls

- ERCOT's Information Technology controls are designed to provide assurance that data related to financial activities in the ERCOT market is accurate, protected and secure
 - Control Objective 16 – Computer Operations (10 controls)
 - Control Objective 17 – Management of Configurations and Program Area Changes (14 controls)
 - Control Objective 18 – Application Access (6 controls)

Information Technology Controls – Control 16

- Computer Operations
 - Assurance that the process of managing computer operations provides a reliable processing environment and adequate support to business information systems

- Accomplished through:
 - Operational Procedures
 - Real-time monitoring of systems and processes
 - Helpdesk staffed 24x7
 - On Call Production support staff available 24x7
 - Automated system backups are performed
 - Monitoring IT Infrastructure and Networks

Information Technology Controls – Control 17

- Management of Configurations and Program Area Changes
 - Assurance that the process of managing changes to the IT production environment minimizes the likelihood of disruption, unauthorized alterations, and errors.
- Accomplished through:
 - Procedures governing the approval process to implement change in the production and testing environments – including emergency changes
 - Documented testing of changes prior to implementation
 - Weekly Change Advisory Board where change requests are documented and approved or rejected
 - Documented verification of changes made to the environment once the change is complete

Information Technology Controls – Control 18

- Application Access
 - Assurance that the process of maintaining application security minimizes risk of unauthorized use, disclosure or modification, damage or loss of information.

- Accomplished through:
 - Restricted access to production
 - Procedures to enable access removal upon termination or job change
 - Annual user access recertification
 - Annual role entitlements recertification

Questions?

Appendix

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
1 (QSE Qualification and Credit Monitoring)	(Control activities provide) reasonable assurance that only qualified Market Participants can participate in the ERCOT market.	<ul style="list-style-type: none">• QSE and CRRAH Applications are independently reviewed for completeness• Established credit limits are monitored• Total of 12 controls
2 (Network Model)	Reasonable assurance that changes to the Network Operations Model are authorized and processed completely and accurately.	<ul style="list-style-type: none">• Network Operations Model performs a level 1, level 2 and level 3 validation• Testing and approval in development stage prior to movement to production• Total of 9 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
3 (Congestion Revenue Rights Auction)	Reasonable assurance that CRR allocation and auction data (for use in settlements) are calculated accurately and completely.	<ul style="list-style-type: none">• CRR Auction awards are monitored by two CRR team members• Systemic controls over exceeding credit limits• Total of 8 controls
4 (Scheduling and Bidding)	Reasonable assurance that offers, schedules, trades, bids and the current operating plan submitted by QSE's are received by ERCOT completely and accurately.	<ul style="list-style-type: none">• Test transactions are performed• Systemic validations prior to execution of the DAM• Total of 3 controls
5 (LMP Price Validation)	Reasonable assurance that LMP pricing calculations are accurate.	<ul style="list-style-type: none">• Analyst review• Pricing validation reports• Total of 6 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
6 (Retail EDI Transaction Processing)	Reasonable assurance that changes to QSE relationships for ESI IDs used in the data aggregation process are based on change notices communicated to LSE's and consistent with ERCOT retail systems.	<ul style="list-style-type: none">• Systemic validations• Reconciliation of data from the ESI ID registration system• Action regarding error messages related to above reconciliation• Total of 6 controls
7 (Meter Data Acquisition- Non-EPS)	Reasonable assurance that non-EPS meter data collected and used in the settlement process is complete.	<ul style="list-style-type: none">• Acknowledgement, validation and tracking of meter data• Systemic validations• Analytical review of reports• Total of 7 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
8 (Meter Data Acquisition – EPS)	Reasonable assurance that EPS meter data collected and used in the settlement process is complete.	<ul style="list-style-type: none">• Meter design approvals• Review of meter communication reports• Validity checks• Total of 11 controls
9 (Meter Data Aggregation Unaccounted Energy)	Reasonable assurance that ERCOT aggregates load data, applies losses, and applies unaccounted for energy completely and accurately for use in the settlement process.	<ul style="list-style-type: none">• Manual verification of data for NOIE's• Systemic validations• Total of 9 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
10 (Settlement Data Input and Validation)	Reasonable assurance that data used in the settlement process is imported into the settlements and billing system (S&B) completely and accurately.	<ul style="list-style-type: none">• Transmission validation of data between EMS and CSI• Review of transmission reports on CRR auction results and resolution of discrepancies• Total of 12 controls
11 (DAM Settlement Statements and Invoices)	Reasonable assurance that amounts and charges are calculated completely and accurately by the S&B system for use in settlement statements and invoices for the DAM including relevant CRR settlements.	<ul style="list-style-type: none">• Manual independent verification of calculations for the DAM• DAM procedure• Total of 7 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
12 (Real Time Market Settlement Statements and Invoices)	Reasonable assurance that amounts and charges are calculated completely and accurately by the S&B system for use in settlement statements and invoices for the RTM including relevant CRR settlements.	<ul style="list-style-type: none"> • Systemic validations of formulas dictated by the protocols • Independent validation of calculated payments and charges for the RTM • Dual review • Total of 6 controls
13 (CRR Invoices)	Reasonable assurance that non-settlement amounts and charges are calculated completely and accurately for CRR's.	<ul style="list-style-type: none"> • Independent verification of amounts calculated for revenue distribution agreed to independently calculated amounts • Dual review • Total of 11 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
14 (Other Invoices)	Reasonable assurance that non-settlement amounts and charges are calculated completely and accurately for use in the non-settlement invoices (Late fees, misc, etc.).	<ul style="list-style-type: none">• Independent verification of amounts calculated for fees per the system agreed to independently calculated amounts• Dual review• Total of 9 controls
15 (Financial Transfers)	Reasonable assurance that payments received from/paid to Counter Parties are processed accurately and completely.	<ul style="list-style-type: none">• Financial transfer approval process• Systemic validation• User access controls• Total of 4 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
16 (Computer Operations)	Reasonable assurance that the process of managing computer operations provides a reliable processing environment and adequate support to business information systems.	<ul style="list-style-type: none"> • Monitoring of critical systems 24/7 • Network performance reporting • Automated backups • Total of 10 controls
17 (Management of Configurations and Program Area Changes)	Reasonable assurance that the process of managing changes to the IT production environment minimizes the likelihood of disruption, unauthorized alterations, and errors.	<ul style="list-style-type: none"> • Change request forms • Segregation of access to development and production platforms • Documented operating procedures • Total of 14 controls

SSAE16: Components and Controls at ERCOT

Objective #	Control Objective	Sample Control Activities
18 (Application Access)	Reasonable assurance that the process of maintaining application security minimizes the risk of the unauthorized use, disclosure or modification, damage or loss of information.	<ul style="list-style-type: none">• Request forms/termination notifications• Annual user access certification• Total of 6 controls
19 (Overall Security)	Reasonable assurance that the process of maintaining database, operating system, network and facilities security minimizes the risk of the unauthorized use, disclosure or modification, damage or loss of information or assets.	<ul style="list-style-type: none">• Cyber event monitoring• Server and database reviews• Access request form• Physical access such as biometric access• Physical security policies and procedures• Total of 26 controls