EWS Modification Workshop

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Nov. 14, 2014

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Agenda

- Introductions
- The Problem
- The Reason We Are Meeting
- Current Solutions
- Aspects of the Issue
- Desired End State – Straw Man
- Possible Technical Solutions
- Consensus and/or Next Steps

The Problem

As a result of our design, retrieval of time critical data is inefficient and does not serve the market or ERCOT's needs.

The Problem is…

Self inflicted
External Web Services and MIS architecture based exclusively on a "Pull" model

A well travelled path
Approach mirrors past efforts to distribute data

Inefficiency on everyone's part
Resource allocation and utilization
Performance
Code intensive

Completely expected
Market Participants need the most up to date data to make the best business decisions

Metrics

For the Q3 2014
- 58.6 million report downloads

- Of these, 47.1 million (80%) were Public documents
  - 27.2 million (46%) were downloads made by unauthenticated clients
  - 19.9 million (34%) were downloads made by authenticated clients

- 51.2 million (87%) downloads made thru MIS
- 7.4 million (13%) downloads made thru EWS

Data by Classification

| Class | Downloads | | Data Transmitted | |
	Count	%	Sum	%
Public	47,121,254	80%	4,533,881,763,163	67%
Secure	8,257,804	14%	1,526,873,629,696	23%
Certified	3,248,831	6%	667,523,081,639	10%

The Reason We Are Meeting

Not just to solve the problem…but to determine:

- Which aspects of the problem do we solve?
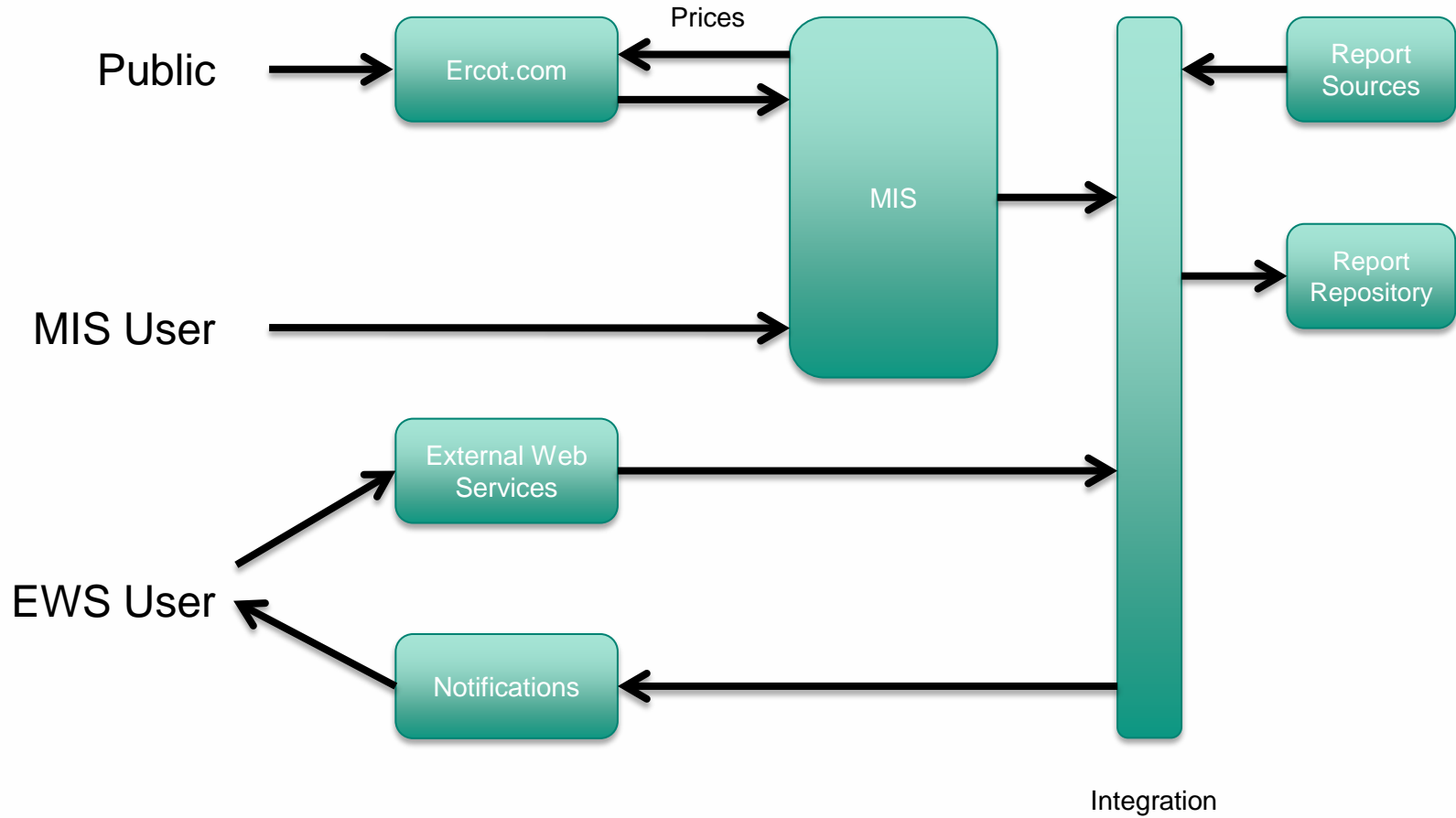
- What does a solution look like to the consumers of the data?

- How much of the problem do we need to solve?

Also a chance to discuss issues and ideas for other future enhancements

Out of Scope for today:
- Changing the manner and timing of report generation
- Discussing the creation of a data repository for direct access

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Current Solution

Public → Ercot.com ← Prices — MIS

MIS User → MIS

MIS → Integration

Report Sources → Integration

Integration → Report Repository

EWS User → External Web Services → Integration

Integration → Notifications → EWS User

Integration

Aspects of the Issue

Suggestions for how to divide the problem:

Public	Non-Public
Smaller, higher frequency, simpler data sets	Larger, lower frequency, more complex data sets
Anonymous clients in addition to Authenticated	Authenticated clients only
80% of all files downloaded	20% of all files downloaded
67% of all data downloaded	33% of all data downloaded

Food for thought:

Nearly ½ of the download requests serviced are for unauthenticated consumers of data

Aspects of the Issue

Notification Only	Push or Stream Data
Least amount of change. Existing download schemes would remain.	Considerable changes at both ends of the exchange.
Size of report has no impact	Not well suited to larger data sets
Latency would exist in processing the Notification on the client's side	High value data could be delivered in near real time with little latency
Could support Public and non-public data with a public subscription approach possible	Could support both Public and non-public data, but non-public data would be more challenging to stream

Expect the ultimate solution is a hybrid approach combining these features

Long Term Vision – Straw Man

1. Stream high value data sets publically
   - Prices and System Load are obvious targets
   - Other high value small data sets
2. Notifications when new reports are available
   - Include DocID and URL for retrieval where appropriate
3. Subscription facility for data distribution and/or notifications
   - MPs can select by Report ID how they want the data managed
   - Public version for email or twitter notifications
4. Provide improved download facility
   - Simplify identification of new files, for example
5. Public API
   - Unauthenticated users accessing Public content
   - Lightweight
   - More current technology

Appendix
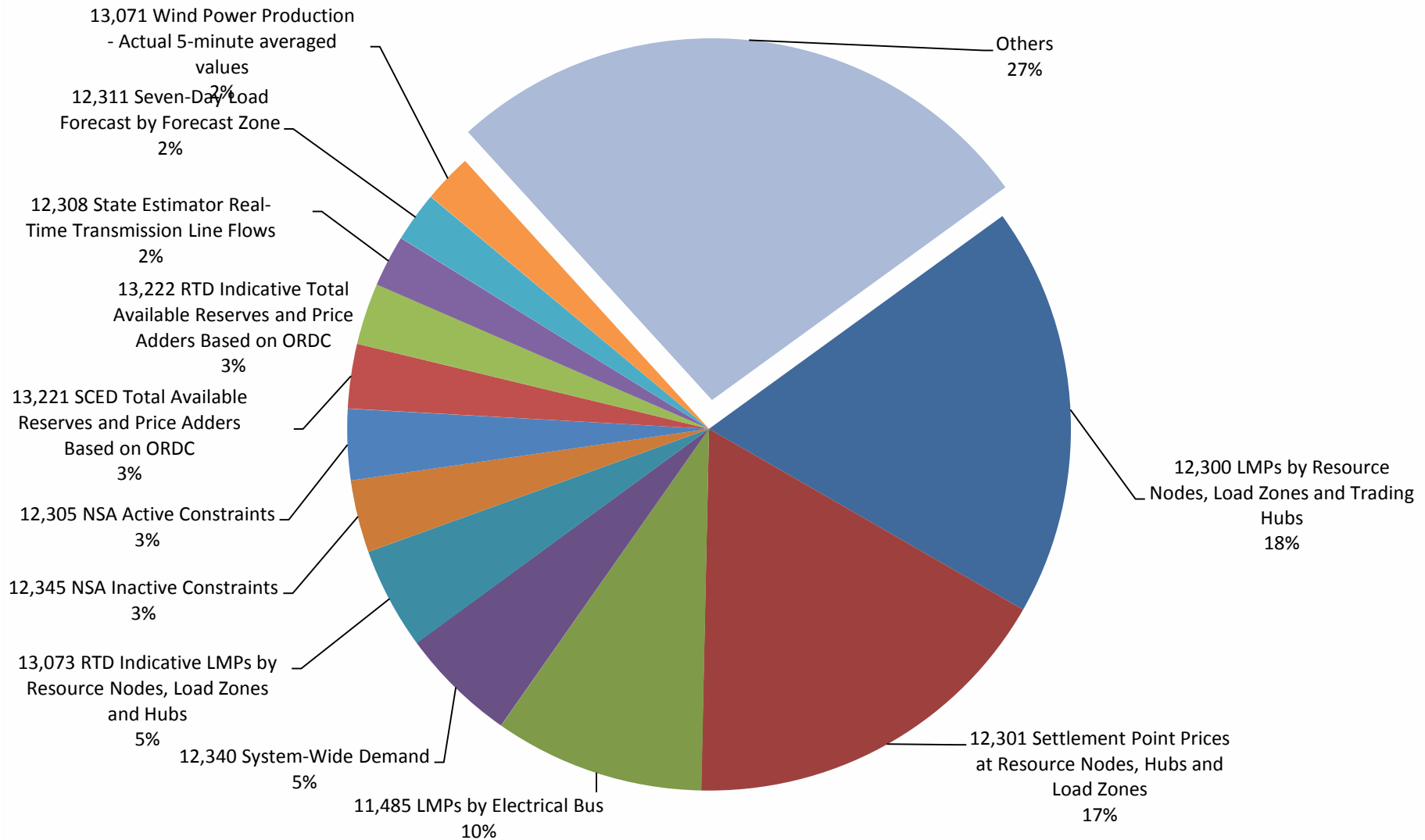
Downloads, All methods, Q3 2014 – Top 12 by DL

Report ID	Class	Report Name	Rpts/Day	Down loads	% of DLs	Total DL size (Bytes)	% of Total DL Size
12,300	PUBLIC	LMPs by Resource Nodes, Load Zones and Trading Hubs	*	10,745,134	18.33%	36,843,827,954	0.55%
12,301	PUBLIC	Settlement Point Prices at Resource Nodes, Hubs and Load Zones	96	9,972,062	17.01%	37,816,255,860	0.56%
11,485	PUBLIC	LMPs by Electrical Bus	*	5,505,216	9.39%	265,197,329,375	3.94%
12,340	PUBLIC	System-Wide Demand	24	3,049,204	5.20%	1,421,780,912	0.02%
13,073	PUBLIC	RTD Indicative LMPs by Resource Nodes, Load Zones and Hubs	*	2,676,047	4.56%	104,075,508,176	1.55%
12,345	SECURE	NSA Inactive Constraints	*	1,888,338	3.22%	1,783,840,881	0.03%
12,305	SECURE	NSA Active Constraints	*	1,866,062	3.18%	1,315,180,969	0.02%
13,221	PUBLIC	SCED Total Available Reserves and Price Adders Based on ORDC	*	1,688,828	2.88%	946,823,541	0.01%
13,222	PUBLIC	RTD Indicative Total Available Reserves and Price Adders Based on ORDC	288	1,611,135	2.75%	1,084,367,593	0.02%
12,308	SECURE	State Estimator Real-Time Transmission Line Flows	*	1,349,198	2.30%	3,642,821,149	0.05%
12,311	PUBLIC	Seven-Day Load Forecast by Forecast Zone	24	1,316,743	2.25%	15,040,566,599	0.22%
13,071	PUBLIC	Wind Power Production - Actual 5-minute averaged values	288	1,280,202	2.18%	773,375,938	0.01%

* Per SCED Run, no less than 288 reports per day (EMIL)

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Report Downloads by Number of Downloads
Q3 2014

13,071 Wind Power Production - Actual 5-minute averaged values
2%

12,311 Seven-Day Load Forecast by Forecast Zone
2%

12,308 State Estimator Real-Time Transmission Line Flows
2%

13,222 RTD Indicative Total Available Reserves and Price Adders Based on ORDC
3%

13,221 SCED Total Available Reserves and Price Adders Based on ORDC
3%

12,305 NSA Active Constraints
3%

12,345 NSA Inactive Constraints
3%

13,073 RTD Indicative LMPs by Resource Nodes, Load Zones and Hubs
5%

12,340 System-Wide Demand
5%

11,485 LMPs by Electrical Bus
10%

Others
27%

12,300 LMPs by Resource Nodes, Load Zones and Trading Hubs
18%

12,301 Settlement Point Prices at Resource Nodes, Hubs and Load Zones
17%

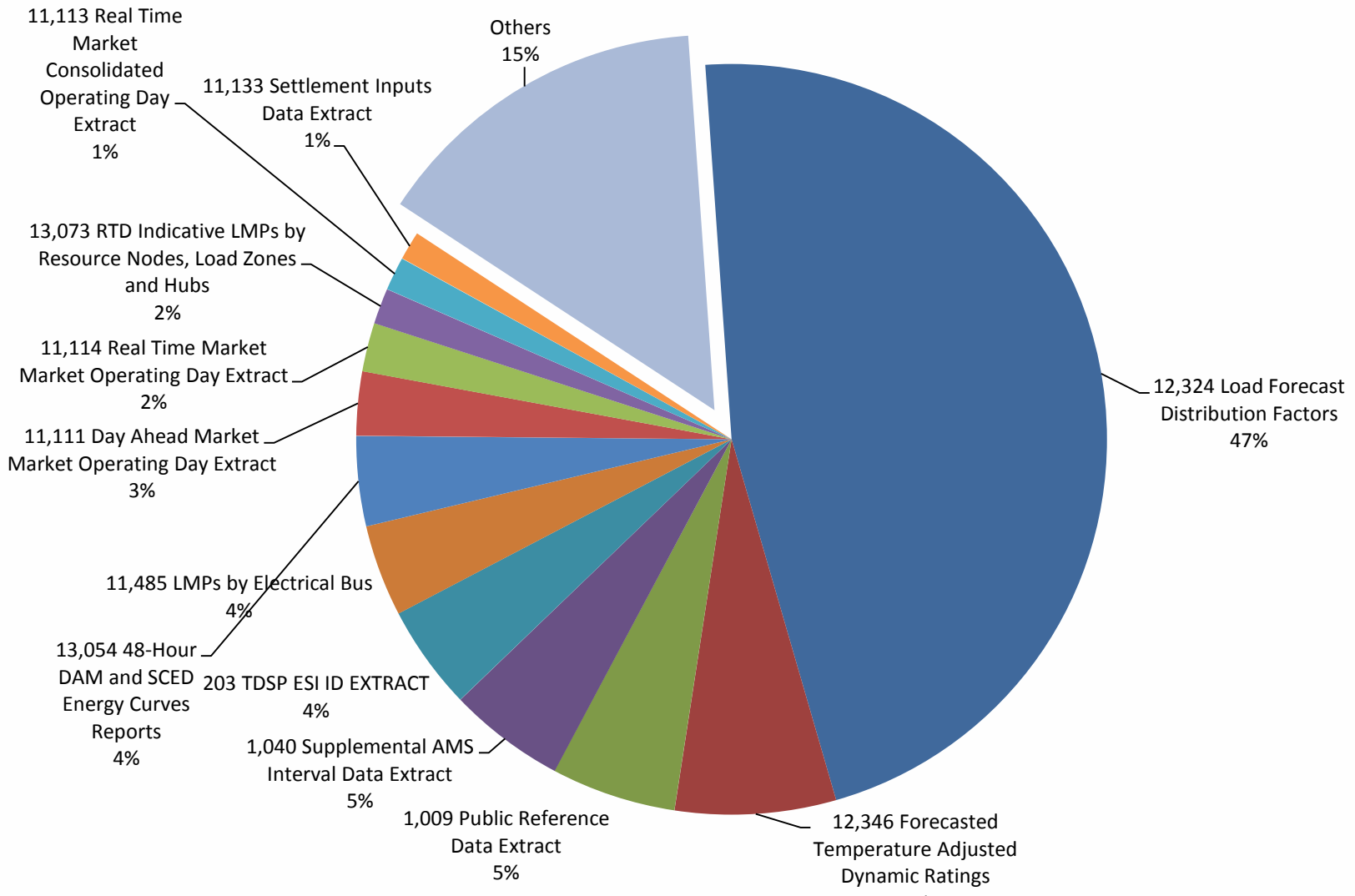**EWS Modification Workshop**
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Downloads, All methods, July-Sept 2014 – Top 12 by Size

Report ID	Class	Report Name	Rpts/Day	Down loads	% of DLs	Total DL size (Bytes)	% of Total DL Size
12,324	PUBLIC	Load Forecast Distribution Factors	24	77,927	0.13%	3,136,918,274,155	46.62%
12,346	SECURE	Forecasted Temperature Adjusted Dynamic Ratings	24	48,195	0.08%	466,029,044,961	6.93%
1,009	SECURE	Public Reference Data Extract	1	29,401	0.05%	360,857,017,982	5.36%
1,040	CERTIFIED	Supplemental AMS Interval Data Extract	1	15,200	0.03%	337,830,309,501	5.02%
203	PUBLIC	TDSP ESI ID EXTRACT	1	170,287	0.29%	303,267,125,649	4.51%
11,485	PUBLIC	LMPs by Electrical Bus	*	5,505,216	9.39%	265,197,329,375	3.94%
13,054	PUBLIC	48-Hour DAM and SCED Energy Curves Reports	1	5,946	0.01%	261,122,416,582	3.88%
11,111	SECURE	Day Ahead Market Market Operating Day Extract	**	46,347	0.08%	185,074,213,380	2.75%
11,114	SECURE	Real Time Market Market Operating Day Extract	**	193,671	0.33%	141,009,878,683	2.10%
13,073	PUBLIC	RTD Indicative LMPs by Resource Nodes, Load Zones and Hubs	*	2,676,047	4.56%	104,075,508,176	1.55%
11,113	CERTIFIED	Real Time Market Consolidated Operating Day Extract	**	395,622	0.67%	97,317,270,123	1.45%
11,133	CERTIFIED	Settlement Inputs Data Extract	1	42,476	0.07%	82,910,233,322	1.23%

** Per Settlement Approval + 48 hours (EMIL)

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Report Downloads by Total Size
Q3 2014

- 11,113 Real Time Market Consolidated Operating Day Extract — 1%
- 11,133 Settlement Inputs Data Extract — 1%
- Others — 15%
- 13,073 RTD Indicative LMPs by Resource Nodes, Load Zones and Hubs — 2%
- 11,114 Real Time Market Market Operating Day Extract — 2%
- 11,111 Day Ahead Market Market Operating Day Extract — 3%
- 11,485 LMPs by Electrical Bus — 4%
- 13,054 48-Hour DAM and SCED Energy Curves Reports — 4%
- 203 TDSP ESI ID EXTRACT — 4%
- 1,040 Supplemental AMS Interval Data Extract — 5%
- 1,009 Public Reference Data Extract — 5%
- 12,346 Forecasted Temperature Adjusted Dynamic Ratings
- 12,324 Load Forecast Distribution Factors — 47%

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Downloads, All methods, July-Sept 2014 – Top 5 Retail

Report ID	Class	Report Name	Rpts/Day	Down loads	% of DLs	Total DL size (Bytes)	% of Total DL Size
203	PUBLIC	TDSP ESI ID EXTRACT	Daily, Monthly	170,287	0.29%	303,267,125,649	4.51%
1,039	CERTIFIED	Interval Data LSE Activity Report	As Needed	56,423	0.10%	27,120,771,978	0.40%
13,067	CERTIFIED	867_03 IDR Activity Report	Daily	2,419	0.00%	10,978,662	0.00%
235	CERTIFIED	Potential Load Loss Report	Daily	996	0.00%	24,485,733	0.00%
109	CERTIFIED	Siebel Service Order Extract	Daily, Weekly ,Quarterly	757	0.00%	3,421,219,017	0.05%

Possible Technological Solutions

1. Streaming
   - Consider HTML5 WebSockets
     - In theory, could explore moving submissions to this transport provided security could be addressed.
   - JMS messages also an option, though not helpful for Public consumption.
2. Notification of Report Availability
   - Extend existing Notifications infrastructure would provide functionality with low complexity
     - Would require refactoring some functions to insure timely delivery of messages
     - Another client listener leveraging Asynchronous HTTP could also be used
     - These solutions do not address broadcast or public notifications
   - WebSockets could solve this problem as well
     - Supports broadcast and public messaging.
   - Public notifications could utilize Twitter
   - Notification of any new Public content would be a good starting place
     - Eligibility to download non-public content is evaluated at time of request
     - Notification of availability of non-public content would require eligibility to be evaluated at time of publication

Possible Technological Solutions

3. Subscription Facility
   – Web portal, allows for self managed subscription to content or notification.
   – Populate metadata repository for use by Distribution infrastructure
   – Could be extended to Public access if needed
   – Service enabling is also an option, in a manner similar to change ActiveNotificationURL in EWS

4. Report Download simplification
   – Are there opportunities to make finding content easier?
     • Restructure landing page to provide lists of the most recent public and non-public content?
     • Other concerns about the interactive method for retrieving reports?

5. Public API
   – Lightweight RESTful request/reply service
     • Would need to be managed "out of band" from Non-Public traffic
   – Managed File Transfer solutions could address this and the previous item.
     • UI that is similar to Report Explorer
     • API access would also be available with these solutions