SmartConnect Use Case:
D8 – Planners Perform Analytics Using Historical SmartConnect Data

December 26, 2009

Document History

Revision History

Revision Number	Revision Date	Revision / Reviewed By	Summary of Changes	Changes marked
(#)	(yymmdd)	(Name)	(Describe change)	(N)
0.1	081002	Grant Gilchrist	Initial draft from workshop on August 12, 2008	N
0.2	081117	Ben Rankin	Updated based on comments and corrections	N
1.0	081226	Deborah Catanese	Edits to drafts previously reviewed by SMEs	Y
				N

Approvals

This document requires following approvals.

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Contents

1. Use Case Description

1.1 Use Case Title

Planners Perform Analytics Using Historical SmartConnect Data

1.2 Use Case Summary

This use case describes how distribution planners can use data from the SmartConnect Network Management System (NMS) to improve long-term planning of the distribution network. Various external industry groups and agencies have developed use cases that describe the use of historical loading information to predict the results of immediate switching decisions or to optimize assets in the short term. The goal of this use case is to describe the process of using historical information on the loading of circuits, segments and branches to develop longer term planning forecasts (1-,5-,10-year) and to direct decision-making as to which sections of the distribution system should be targeted/prioritized with investment capital for upgrades, load growth projects, etc.

This use case also discusses how SmartConnect data can help automate other analytic tasks typically performed by distribution planners, for example, the process of creating reliability reports and analyzing the impact of customer choices on the grid, such as demand response participation and integration of distributed generation.

1.3 Use Case Detailed Narrative

1.3.1 Purpose and Benefits

In developing long-term plans distribution planners must make decisions about when and where the following tasks should be performed on the electrical distribution network:

- Upgrading to a larger conductor
- Upgrading the voltage of a circuit
- Reconfiguring the layout of a circuit
- Extending a circuit
- Creating a new circuit

Before installation of the SmartConnect system these decisions could only be determined based on data from the Supervisory Control and Data Acquisition (SCADA) system. The SCADA system is limited to providing loading information only at a substation or circuit level and is not capable of monitoring all circuits.

With the deployment of SmartConnect Meters across the entire utility service area there are unprecedented opportunities for improving the quality and reducing the costs of distribution planning. Planners can examine loading information at a circuit, segment, branch, or distribution transformer level and determine accurately – rather than estimating – where and when peak loading is occurring. Using actual measurements instead of estimates allows planners to more accurately account for variations from typical customer loads including housing density, geographic location, climate zones, and housing design standards.

Table 1 illustrates the typical relationship between distribution system components. By aggregating the load measured by all the customer meters on a particular component, a planner knows the total load going through that component. Because the data is provided by interval meters the time stamped, coincident loading information can be known for any hour of any day. This aggregation of loading data can also be automated so the planner can query any particular portion of the network required at any time. Among other things, this provides the planner with information regarding coincident peak loading for subsets of customers under a common transformer, circuit segment, circuit, or substation.

Table 1 – Typical Distribution Structure

Customers	Per Component	Number per next level Component
3-12	Distribution Transformer	1-20 per branch or segment
20-70	Branch	0-5 per segment
400	Segment	5 per circuit
1500-2000	Circuit	4300 in system

1.3.2 The Segment Load Calculation Process

This use case postulates a software application, the Segment Load Calculation Process (SLCP), that periodically performs the aggregation of customer meter loading data by distribution system component. It stores this aggregated data in a Planning Data Warehouse that can be either part of another database or a stand-alone database within the SmartConnect system.

To operate correctly, the SLCP must have access to connectivity information describing which customers are attached to which components. Connectivity down to the substation and circuit level is stored in the Outage Management System (OMS). Connectivity information that maps customers to circuits, segments, branches, and distribution transformers are stored in the Transformer Load Management (TLM) Database. Acquisition of this information is discussed in Use Case D7.

The objective of the SLCP is to convert the large amount of data gathered by the SmartConnect system into useful information for the Distribution Planners. Using the hourly average and peak kVA (or shorter interval) and amperes data provided for each customer by the SmartConnect NMS, it records the following information per run:

- A configured number of peak load measurements for each component (transformer/circuit segment/branch), including the time each of the top five peaks occurred

- The number of hours each component was at or above a configured loading level
- The average load on the component
- The highest coincident loading on configured groups of components (planners determine what constitutes a group)

This use case proposes running the SLCP once a week. Use Case D6 - *Distribution Operator Controls Distribution System Using SmartConnect Data* requires similar segment loading calculations be performed at least each day.

In addition, the SLCP calculates and identifies:

- Peak weeks – those weeks having a configured number of days in a row in which the component was at or near peak load. This calculation is useful because transformers must have sufficient time to cool off between periods of high usage.
- Peak months
- Peak seasons

This use case assumes that planners use the Planning Data Warehouse to retrieve the stored peak loading data by component or groups of components, and to display reports, graphs and other visualizations for the planners.

1.3.3 Reliability Reports

Planners are often required to produce reliability reports for regulators. Calculations for these reports can be awkward and costly due to the need to coordinate information from multiple sources such as customer calls, actions by the OMS, work orders, and status reports.

The SmartConnect system can improve this process. SmartConnect meters can be programmed to report outages and voltage sags, including duration and magnitude. Because this reporting can be enabled across the service territory and follows a standard format, the process of creating an accurate reliability report can be largely automated.

This use case postulates a Reliability Event Historian in which the SmartConnect NMS stores meter event reports. This database can be part of the Planning Data Warehouse, the Meter Data Warehouse or a stand-alone database within the SmartConnect system.

1.3.4 Impact Reports

Once the peak loading data in the Planning Data Warehouse is available, planners are able to correlate the information against customer characteristics such as: participation in demand response programs, their ability to provide dispatchable generation, and the types of load available to them, in order to determine the impact these factors have on loading. This use case assumes that the Planning Data Warehouse provides a front-end reporting tool for the planner to query this information.

1.3.5 Scenarios

This use case includes the following scenarios:

1. **Planners assess load growth and pattern at segment or branch level using meter load data.** This is the main scenario described in the narrative in which the SLCP aggregates customer load information and stores peak loading information for each distribution component in the Planning Data Warehouse. Planners can then query this loading data to evaluate growth at the segment or branch level.
2. **Planners identify capital deferral options by profiling equipment loading based on meter data.** This scenario is similar to the first scenario except the query from the planner focuses on conducting equipment (transformers, switches, capacitor banks) rather than particular circuits or segments.
3. **Forecaster creates 1-, 5- and 10-year residential, commercial and industrial planning forecasts using SmartConnect data.** This scenario is again similar to the first scenario except the final objective is to create planning forecasts.
4. **Utility automatically creates reliability reports from SmartConnect data.** This scenario describes how a utility engineer generates reliability reports derived from power quality information reported by SmartConnect meters that are suitable for submittal to regulators.
5. **Planners analyze grid impacts from increasing demand-side resources and Distributed Energy Resources (DER) using SmartConnect data**. This scenario describes how distribution planners correlate loading patterns with customer characteristics in order to determine how demand response, DER and alternative energy sources affect loading. Marketing's use of this information to target demand response programs to customers is discussed in Use Case C7.

1.4 Business Rules and Assumptions

- This use case applies to distribution networks of 33kV and below.
- The circuit topology information in OMS and the TLM database has already been gathered and is of sufficient accuracy.
- The standard usage data (15 min. average kWh) provided by Meter Data Management System (MDMS) calculations is not adequate for determining loading on circuit elements. Because component ratings are for total current not just real power (kWh) this loading is usually measured in amperes or kVA.
- Once the SmartConnect system is in place, planners will place stronger emphasis on voltage management than today.
- Branches have either a protective device capable of measuring voltage or kVA, or SmartConnect meters to measure these quantities.
- Weekly peak load readings provide sufficient information needed to perform distribution planning.
- DER and demand response reduce measured loads for the described planning processes.

2. Actors

Actor Name	*Actor Type*	*Actor Description*
Customer	Person	Residential or small business energy user that contracts to receive electrical service from a utility and agrees to have a SmartConnect meter installed. May or may not participate in programs provided by the utility such as pricing events, load control or distributed generation.
Customer Service System (CSS)	System	Maintains customer contact information, calculates and formats customer bills, receives and applies payments for individual accounts. The system is responsible for storing customer information such as site data, meter number and rates.
Customer Relationship Management (CRM)	System	Maintains detailed information about each customer including customer class, demand response program participation, use of distributed generation, load types, and demographics. In the future it may include information presently stored in the CSS.
Demand Response Availability And Control System (DRAACS)	System	Sends demand response event notifications to meters and load control devices through the SmartConnect system. Provides demand response options to operators, market traders, etc. based on predefined groupings of customers and statistical analysis of how those customers have responded in the past. Responsible for estimating, with precision, how much demand response resource is available for dispatch. Accepts requests for blocks of energy and handles the details of implementing requests by issuing load control signals. It is expected that in order to refine its internal model, the DRAACS will track "as implemented" responses to load control signals.
Outage Management System (OMS)	System	A distribution management system that uses an analysis engine to identify the location of outages. Using information from the Geographic Information Services, CSS, SCADA, and SmartConnect systems it correlates to end-point outages and infers root causes by identifying common failure points grouped upstream. Helps reduce outage duration and assists with restoration plans. Determination of outage locations is based on the system's knowledge of the power system topology.
Planning Data Warehouse	Database	A storage location for planning-related information. Not related to usage or demand data, such as voltage and VAR histories.
Reliability Event Historian	System	A system including a database that is responsible for storing all power quality data gathered by the utility. May be a part of the Planning Data Warehouse.
SmartConnect Meter	Device	Advanced electric revenue meter capable of two-way communications with the utility. Serves as a gateway between the utility, customer site, and customer's load controllers. Measures, records, displays, and transmits data such as energy usage, generation, text messages, event logs, etc. to authorized systems (i.e., the SmartConnect NMS) and provides other advanced utility functions.

Actor Name	Actor Type	Actor Description
SmartConnect Network Management System (NMS)	System	The utility's back-office system responsible for two-way communications with SmartConnect Meters to retrieve data and execute commands. Balances load on the communications network resulting from scheduled meter reads. It retries meters during communications failures and monitors the health of the advanced metering infrastructure. Remotely manages and implements firmware updates, configuration changes, provisioning functions, control and diagnostics.
Meter Data Warehouse	System	Location where all raw and aggregated meter data is stored. Responsible for long-term storage of meter data including energy usage, demand, generation, events, logs, and other time-related information measured by the meter or calculated from that data. Does not contain information on the configuration, management, diagnostics, and maintenance of the meters themselves. Includes certain software applications responsible for filtering, analyzing, and reporting meter data.
T&D Planner	Person	Personnel responsible for developing, designing, and scheduling the changes to and maintenance of the distribution network.
Segment Load Calculation Process (SLCP)	System	A software application that gathers kVA and ampere loading data from the SmartConnect NMS to periodically calculate peak and average loading information for each transformer, switch, segment, circuit breaker, feeder or other element of the distribution system. Functionality is similar to the Transformer Load Calculation Engine (TLCE) discussed in Use Case D7.
Transformer Load Management (TLM) Database	System	Stores two primary types of information: 1) connectivity data describing which customers are connected to which transformers, switches, segments, circuit breakers, feeders or other elements of the distribution system; and 2) historical loading data, capturing how much load is on any of these elements at a given time. Utilizes software applications to generate analyses and reports (periodically or on request) from the collected data.
Utility Engineer	Person	Utility employee responsible for providing reliability reports to the regulator on behalf of the utility.

3. Step-by-Step Analysis of Each Scenario

3.1 Primary Scenario: Planners assess load growth and pattern at segment or branch level using meter load data

This is the main scenario described in the narrative in which the SLCP aggregates customer load information and stores peak loading information for each distribution component in the Planning Data Warehouse. Planners then query this peak loading data to evaluate growth at the segment or branch level.

Triggering Event	***Primary***	***Pre-Condition***	***Post-Condition***
Identify the name of the event that initiates the scenario	*Identify the actor whose point-of-view is primarily used to describe the steps*	*Identify any pre-conditions or actor states necessary for the scenario to start*	*Identify the post-conditions or significant results required to complete the scenario*
SmartConnect meters report loading history for each customer daily.	T&D Planner	Topology information identifying which customers are located on each distribution system component is stored in the TLM Database per Use Case D7.	Planners are able to visually monitor peak loading information for any requested distribution system component and time period.

3.1.1 Steps for this scenario

Step #	*Actor*	*Description of the Step*	*Additional Notes*
#	*What actor, either primary or secondary is responsible for the activity in this step?*	*Describe the actions that take place in this step. The step should be described in active, present tense.*	*Elaborate on any additional description or step value to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.*
1	SmartConnect Meter	Measures and reports loading history data daily to the Meter Data Warehouse.	Average kVA and ampere data from each meter, at each interval (1 hour or possibly 15-minutes). Average voltage from selected meters at each interval.
2	Meter Data Warehouse	Forwards daily loading history to SLCP.	
3	SLCP	Reads distribution system topology from TLM Database and OMS connectivity database.	
4	SLCP	Periodically calculates for each distribution component: peak load occurrences, hours near peak, average loads, coincident peak loads, peak days, peak weeks, and peak seasons. Stores calculations in the Planning Data Warehouse.	Discards the individual load profile histories for each distribution component after calculating and storing the peak and average information described in this step. Meter data warehouse will continue to store usage load profile histories for each meter end point.
5	T&D Planner	Queries the Planning Data Warehouse for peak loading data.	
6	Planning Data Warehouse	Responds to query. May access SCADA historian for full circuit-level information.	
7	Planning Data Warehouse	Provides peak loading data in time series and statistical graphs, reports, and other visualizations.	

3.2 Primary Scenario: Planners identify capital deferral options by profiling equipment loading based on meter data

This scenario is similar to the first scenario, except this query from the planner focuses on individual pieces of equipment rather than particular circuits or segments.

Triggering Event	***Primary***	***Pre-Condition***	***Post-Condition***
SmartConnect meters report loading history for each customer daily.	T&D Planner	Topology information identifying which customers are located on each distribution system component is stored in the TLM Database per Use Case D7.	Planners are able to visually monitor peak loading information for any requested distribution system component and time period.

3.3 Primary Scenario: Forecaster creates 1, 5 and 10-year residential, commercial, and industrial planning forecasts using SmartConnect data

This scenario is similar to the first scenario except the end objective is to create load forecasts.

Triggering Event	***Primary***	***Pre-Condition***	***Post-Condition***
Identify the name of the event that initiates the scenario	*Identify the actor whose point-of-view is primarily used to describe the steps*	*Identify any pre-conditions or actor states necessary for the scenario to start*	*Identify the post-conditions or significant results required to complete the scenario*
SmartConnect meters report loading history for each customer daily.	T&D Planner	Topology information identifying which customers are located on each distribution system component is stored in the TLM Database per Use Case D7.	Planners are able to visually monitor peak loading information for any requested distribution system component and time period.

3.4 Primary Scenario: Utility automatically creates reliability reports from SmartConnect data

This scenario describes how a utility engineer generates reliability reports derived from power quality information reported by SmartConnect meters, suitable for submittal regulators.

Triggering Event	Primary	Pre-Condition	Post-Condition
Identify the name of the event that initiates the scenario	*Identify the actor whose point-of-view is primarily used to describe the steps*	*Identify any pre-conditions or actor states necessary for the scenario to start*	*Identify the post-conditions or significant results required to complete the scenario*
A power quality event occurs such as a sag, swell or interruption.	Utility Engineer	SmartConnect meters are remotely programmed to report power quality information. The Reliability Event Historian can also receive power quality information from other system devices.	Utility engineer has access to a reliability report for the required timeframe.

3.4.1 Steps for this scenario

Step #	Actor	Description of the Step	Additional Notes
#	*What actor, either primary or secondary is responsible for the activity in this step?*	*Describe the actions that take place in this step. The step should be described in active, present tense.*	*Elaborate on any additional description or step value to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.*
1	SmartConnect Meter	Measures and reports duration and magnitude of each power quality event to SmartConnect NMS.	As defined and required by IEEE standards particularly the duration of the outage, and duration and magnitude of sag.
2	SmartConnect NMS	Forwards power quality events to Reliability Event Historian.	

Step #	Actor	Description of the Step	Additional Notes
3	Utility Engineer	Requests reliability report.	May be for present month, quarter, year, or a selected time period. May be for the entire system, a region, substation, circuit, or circuit segment.
4	Reliability Event Historian	Reliability Event Historian produces requested report.	

3.5 Primary Scenario: Planners analyze grid impacts from increasing demand-side resources and DER using SmartConnect Data

This scenario describes how distribution planners correlate loading patterns with customer characteristics in order to determine how demand response, DER and alternative energy sources affect loading. Use of this information by marketing to target demand response customers is discussed in Use Case C7.

Triggering Event	***Primary***	***Pre-Condition***	***Post-Condition***
Identify the name of the event that initiates the scenario	*Identify the actor whose point-of-view is primarily used to describe the steps*	*Identify any pre-conditions or actor states necessary for the scenario to start*	*Identify the post-conditions or significant results required to complete the scenario*
Planner wants to study DER and demand response impact on the grid.	T&D Planner	Planning Data Warehouse contains peak loading information as described in Scenario 1. The Customer Relationship Manager database contains user characteristics for each customer. The DRAACS has stored information about predicted demand response for each participating customer in the CRM.	Planner can compare user characteristics to peak loading.

3.5.1 Steps for this scenario

Step #	Actor	Description of the Step	Additional Notes
#	*What actor, either primary or secondary is responsible for the activity in this step?*	*Describe the actions that take place in this step. The step should be described in active, present tense.*	*Elaborate on any additional description or step value to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.*
1	T&D Planner	Requests a loading report with specified customer characteristics for those customers attached to a specific section of the distribution grid.	
2	SLCP	Requests customer information from CRM for those customers attached to the grid section under analysis.	
3	CRM	Provides customer information related to DER and demand response enrollment, such as: • Customer class, type, and demographics • Customer load types • Customer forecast behavior during and after demand response events • Total dispatchable kW available	Some of this data may be stored in DRAACS.
4	SLCP	Requests peak load information associated with particular customers from the Planning Data Warehouse.	
5	Planning Data Warehouse	Responds with the peak loading information.	
6	SLCP	Displays the requested peak loading information.	
7	T&D Planner	Analyzes correlations between customer characteristics and loading data. Prepares report.	

4. Requirements

4.1 Functional Requirements

Functional Requirements	*Associated Scenario # (if applicable)*	*Associated Step # (if applicable)*
The SmartConnect meter shall measure and report average kVA and amperes at each interval.	1	1
The SmartConnect meter shall be able to measure and report maximum, minimum and average voltage per interval.	1	1
The Meter Data Warehouse shall forward kVA, voltage and ampere meter data to the SLCP as they are reported.	1	2
The Meter Data Warehouse shall ensure that kVA, voltage and ampere meter data is time synchronized and forwarded as snapshots to the SLCP.	1	2
The SLCP shall read topology information from the TLM Database to determine how to aggregate loading data.	1	3
The TLM Database, OMS and SLCP shall use a common unique identifier for each circuit, segment, branch, segmenting device, and meter-to-circuit attachment.	1	3
The TLM Database shall contain topology information indicating which meters are connected to which distribution transformers, branches, segments, and circuits.	1	3
The SLCP shall aggregate customer loading data to identify peaks at any of the following designated monitoring points: • Total segment loading in amperes and kVA • Loading downstream from any specific switch or protective device • Total branch loading (e.g. downstream from a fuse or tie to segment) in amperes	1	4
The SLCP shall periodically calculate and store in the Planning Data Warehouse a configured number of peak load measurements including the time each peak occurred for each designated monitoring point.	1	4
The SLCP shall periodically calculate and store in the Planning Data Warehouse the number of hours each component was at or above a configured loading level for each designated monitoring point.	1	4

Functional Requirements	*Associated Scenario # (if applicable)*	*Associated Step # (if applicable)*
For each interval, the SLCP shall periodically calculate and store in the Planning Data Warehouse, the average load on the component for each designated monitoring point.	1	4
For each interval, the SLCP shall periodically calculate and store in the Planning Data Warehouse, the maximum and minimum load on the component for each designated monitoring point.	1	4
For each interval, the SLCP shall periodically calculate and store in the Planning Data Warehouse, the highest coincident loading on configured groups of components. Planners shall be able to configure what constitutes a “group”.	1	4
The SLCP shall periodically identify and store in the Planning Data Warehouse the following information for a designated monitoring point,: • Peak weeks – i.e. weeks having a configured number of days in a row in which the component was at or near peak load • Peak months • Peak years	1	4
The SLCP shall discard the individual load profile history for each designated monitoring point, after calculating peak loads in order to eliminate unnecessary data storage.	1	4
The SLCP shall flag and retain individual load profiles for designated monitoring points that occur during a demand response event.		4

Functional Requirements	*Associated Scenario # (if applicable)*	*Associated Step # (if applicable)*
Planners shall be able to query the Planning Data Warehouse for peak loading information according the following attributes: • Circuit identifier • Segment identifier • Branch identifier • Time and date • Substation identifier • Customer (rate) class • Critical load types (hospitals, life support equipment, etc.) • Climate zone • Weather • Other environmental attributes	1	5
The SLCP shall permit planners to query other related data sources such as the SCADA data historian for peak loading data on a circuit or substation level.	1	5
The SLCP shall display peak loading in time series, statistical graphs, circuit one-line diagrams, and other visualizations.	1	7
The SmartConnect meter shall record and report the magnitude and duration of voltage sags and the duration of outages.	4	1
The SmartConnect NMS shall forward power quality information such as voltage sags and outages to the Reliability Event Historian.	4	2
The Reliability Event Historian shall allow a planner to produce reports that meet regulatory requirements from the power quality information stored in the historian.	4	4
The CRM shall permit the SLCP to query customer characteristics.	5	2
The CRM shall contain information on customer class, type and demographics.	5	3
The CRM shall contain information on load types used by customers.	5	3
The CRM shall contain information on customer behavior such as participation in demand response programs and forecasted demand response resource size.	5	3
The CRM shall contain information on a customer's DER capability including dispatchable kW.	5	3
DRAACS shall update each participating customer's expected demand response resource size in the CRM.	5	3

Functional Requirements	*Associated Scenario # (if applicable)*	*Associated Step # (if applicable)*
The SLCP shall identify customers participating in demand response on each branch and segment.	5	6

4.2 Non-Functional Requirements

Non-Functional Requirements	Associated Scenario # (if applicable)	Associated Step # (if applicable)
The SmartConnect meter shall be able to record intervals of 1 hour or 15 minutes for voltage, kVA and ampere data.	1	1
SmartConnect meter intervals shall be time synchronized.	1	1
The SmartConnect meter shall report voltage, kVA and ampere data to the SmartConnect NMS daily.	1	1
The TLM shall provide at least hourly, the topology configuration data to support the correct calculation of load data aggregation due to changing system topology.	1	3
The SLCP shall perform its peak loading calculations at least once per week.	1	5
By default, the SLCP shall identify and store 2 peak loading values per segment and 1 peak loading value per branch for each week.	1	5
The SLCP shall retain peak loading calculations for at least two years.	1	5
Forecasters shall create 1-, 5-, and 10-year load forecasts for residential, commercial, and industrial load using SmartConnect data.	3	--
Planner shall request weekly peak loadings for the last two years with plots of peak trending.	1	7

5. Use Case Models (optional)

5.1 Information Exchange

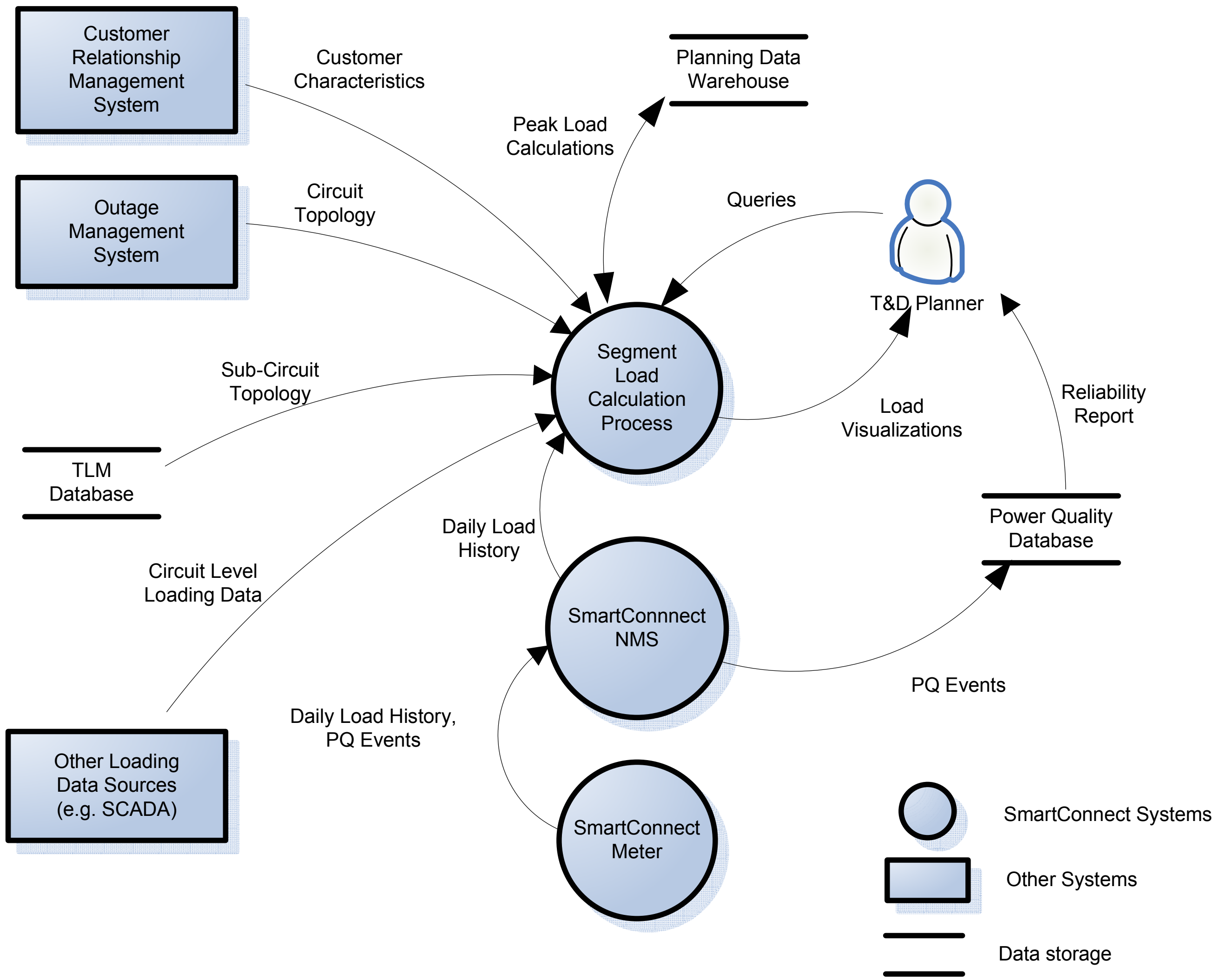
Scenario #	*Step #, Step Name*	*Information Producer*	*Information Receiver*	*Name of information Exchanged*
#	*Name of the step for this scenario.*	*What actors are primarily responsible for producing the information?*	*What actors are primarily responsible for receiving the information?*	*Describe the information being exchanged*
1	1	SmartConnect Meter	Meter Data Warehouse	Daily load history – average for each interval: • kVA • Amperes • Voltage from selected meters
1	2	Meter Data Warehouse	SLCP	Daily load history
1	3	SLCP	TLM Database	Request for sub-circuit topology
1	3	TLM Database	SLCP	Sub-circuit topology – mapping of customers to: • Segment • Branch • Transformer
1	4	SLCP	Planning Data Warehouse	Peak load calculations – for each pseudo-measurement point: • Peak load occurrences • Hours near peak • Average load • Maximum/minimum load • Coincident peak loads • Peak days • Peak weeks • Peak seasons
1	5	T&D Planner	SLCP	Query for peak loading information

Scenario #	Step #, Step Name	Information Producer	Information Receiver	Name of information Exchanged
1	5	SLCP	Planning Data Warehouse	Query for peak load calculations
1	6	Planning Data Warehouse	SLCP	Peak load calculations
1	7	SLCP	T&D Planner	Load visualizations • Time series • Statistical graphs • Reports • One-line diagrams
4	1	SmartConnect Meter	SmartConnect NMS	Power quality events • Outage duration • Voltage sags (magnitude, duration, timestamp) • Per IEEE standards
4	2	SmartConnect NMS	Power Quality Historian	Power quality events
4	3	Utility Engineer or T&D Planner	Power Quality Historian	Request for reliability report
4	4	Power Quality Historian	Utility Engineer or T&D Planner	Reliability report • Need information on requirements – see *Issues.*
5	1	T&D Planner	SLCP	Query for peak load calculations using specified user characteristics
5	2	SLCP	CRM	Query for user characteristics
5	3	CRM	SLCP	User characteristics • Customer class • Customer type • Customer demographics • Customer load types • Customer expected demand response • Customer program participation • Customer DER capability (dispatchable kW)
5	4	SLCP	Planning Data Warehouse	Query for peak load calculations

Scenario #	*Step #, Step Name*	*Information Producer*	*Information Receiver*	*Name of information Exchanged*
5	5	Planning Data Warehouse	SLCP	Peak load calculations
5	6	SLCP	T&D Planner	Load visualizations

5.2 Diagrams

5.2.1 Data Flow Diagram



6. Use Case Issues

Capture any issues with the use case. Specifically, those unresolved issues that help the use case reader understand the constraints or unresolved factors that impact of the use case scenarios and their realization.

Issue
Describe the issue as well as any potential impacts to the use case.
Ensure that topology database (i.e. OMS connectivity database) is updated with all switching operations (planned and emergency) to limit inaccurate aggregated peak load calculations due to changes in topology information.
Determine if true topology that reflects switching is appropriate for all planning calculations or if desired/planned topology should be reflected for some planning processes.
Estimate total number of segments and number of branches required to calculate pseudo point information.
Defer using the following as data sources (pseudo monitoring points): • Secondary voltage sensing (volt/VAR planning – cap bank placement) • Note availability of this data • Consider sampling – when to sample, how often, what time
Determine exactly what data is required in the reliability report for Scenario 4.
Confirm source of topology information and where it is stored – currently assumes combination of TLM database and OMS connectivity database.
Need further input from planners on how they will conduct their work utilizing SLCP and SCADA data historian.
Determine the impact of MRTU nodes on planning.
Define what level of accuracy for the topology information is necessary for planning purposes.
Determine how data is presented using GIS.
Determine the functionality of the SLCP (D8), Planning Data Warehouse (D8), Transformer Load Calculation Engine (D6, D7) and TLM Database (D6, D7, D8) and unify interfaces, calculation processes and data storage as possible.

7. Glossary

Insert the terms and definitions relevant to this use case. Please ensure that any glossary item added to this list should be included in the global glossary to ensure consistency between use cases.

Glossary	
Term	**Definition**
DR	Demand Response - action taken by customer to reduce demand at premise in response to an economic or reliability signal from utility.
DER	Distributed Energy Resources, also known as Distributed Generation (DG). A customer with generation capabilities that can be used to provide support to the distribution system, or potentially support loads other than the customer itself (referred to as an island).
SCADA	Supervisory Control and Data Acquisition, the system used for monitoring the T&D network at approximately 2-second intervals and controlling remote switching.
MDMS	Meter Data Management System. Gathers, validates, estimates and permits editing of meter data such as energy usage, generation, and meter logs. Stores this data for a limited amount of time before it goes to a data warehouse and makes this data available to authorized systems.
MRTU	Market Redesign and Technical Upgrade - a program being undertaken by the California Independent System Operator (“CAISO) to improve grid reliability and fix flaws in the CAISO markets.

8. References

Reference any prior work (intellectual property of companies or individuals) used in the preparation of this use case.

9. Bibliography (optional)

Provide a list of related reading, standards, etc. the use case reader may find helpful.