



VWAC Update 2/15/2018

VWAC Phase II

Agenda

Strategic agreement & JDA KPI Status

Weather Status

Peak Load Management Status

Platform development

2017 JDA + Product Deployment

Commercial Software User Acceptance Testing

2018 JDA + Product Deployment

Strategic agreement & JDA KPI status

Software Deliverables—*Deliver outputs of the Joint Development Agreement and Software License Agreement (used and useful products MaestrOS, Xplore Application, and Hypercast)* **Achieved distinguished KPI status**

Threshold	Target	Distinguished
All JDA outputs timely delivered at price set under JDA	Threshold achieved plus 1 of 3 software products from SLA delivered and accepted at contract price	All JDA and SLA outputs delivered and accepted at contracted price

VWAC specific—*Successfully integrate output of Vermont Weather Analytics Center (VWAC) into VELCO Energy Management System (EMS) to improve accuracy of predictive operating model. We will be successful when all three functions (integration of VWAC output into EMS, establishment of a strategic implementation plan to identify key areas of operational needs, and installation of High Performance Computing Cluster) are completed.* **Achieved distinguished KPI status**

Threshold	Target	Distinguished
1 Function	2 Function	3 Function



VWAC Phase II — weather status

Developments

- *Forecasting and visualization improvements*
 - Nowcast weather forecasts successfully run on VELCO HPCC since October; most recent run on 2/4 (snow/minor event)
 - Testing underway for medium to longer-term (4 to 10 days) weather forecasts from Nostradamus
 - First version of utility outage forecasts for wet snow and ice events developed and delivered by LSC
 - Weather Insights visualization tool now integrated with VEC's real-time Graphical Information System (GIS) network via web service
 - Phase 1 of weather verification platform completed (weather forecasts); first version of web portal also developed
- *Instrumentation*
 - Seven new weather stations and ice sensors delivered; weather stations to be installed at VELCO substations in Q1-2 2018

Next steps

- Deploy improvements to Weather Insights visualization to include additional distribution utility data, observations, alerting, and additional weather variables and increase forecast length to 10 days
- Continue to deliver and improve utility outage forecasts and seek DU feedback
- Complete phase 2 of weather verification platform which includes energy forecasts (State Demand, State PV, Wind, and Solar), begin UAT, and finalize web portal design

VWAC Phase II — peak load management

Developments

- Second version of Peak Load Management deployed
- Email alert deployed for Vermont monthly peak and ISO NE annual peak predictions
- Arrangement of the interface improved to aid in site usability, for example, clearer indication of some functionality

Next steps

- Investigate Vermont monthly peak prediction discrepancy for November and December
- Distributed Energy Resources (DER) are assumed to be dispatched according to plan, and utilize constraints identified with each resource—as feedback reporting on actual DER is developed, system will record actual DER deployment for analysis
- Incorporate longer range weather forecasting capability as UI products are implemented
- ISO NE peak probability forecast by using ISO-NE load data to implement probabilistic load forecast
- Upgrade portal graphics to show more VT specific detail and use GIS derived data

VWAC Phase II — platform development

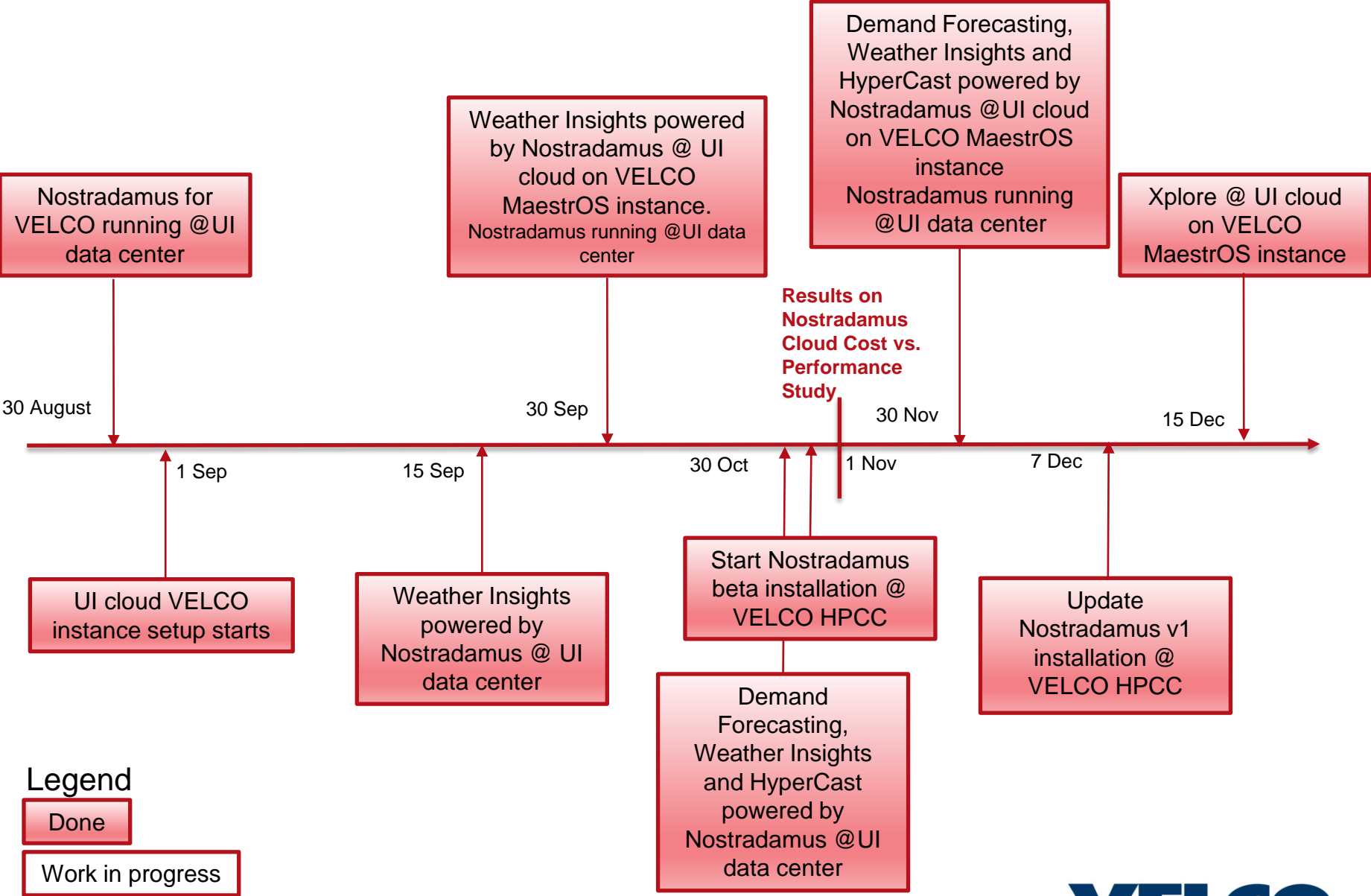
Developments

- Nostradamus v1, Utopus Insights' weather model, is now running on VELCO HPCC; major accomplishment as Nostradamus is a fully supported by Utopus Insights
- In support of Nostradamus installation, VELCO dedicated 10 compute nodes to Utopus Insights
- Hypercast Wind, Hypercast Solar, Xplore, Weather Insights, and Demand Forecasting now running on VELCO cloud version of MaestrOS
- VELCO developed User Acceptance Test Plan to support acceptance of Utopus Insights products
- New version of Hypercast Solar deployed taking into account for snow cover

Next steps

- Deploy Nostradamus v2 Q2 2018 on VELCO HPCC
- Determine need for additional dedicated nodes to support 10 day weather forecast and Nostradamus nowcasts
- Install Grid Xplore on VELCO “Cloud Version” of MaestrOS Q2 2018
- Procure an additional head node and ten computational nodes

2017 JDA + Product Deployment



Commercial Software User Acceptance Testing

Findings

- Initial testing of Utopus Insights software has been executed, logged and documented
- There were no urgent findings, majority were medium and low severity and medium or low priority
- High severity and high priority issues discovered were with security-related functions, functionality not working as expected, unavailable, or broken, glitches and freezes, slow, lagging updates and execution

Testing Statistics

Number of Test Cases

Row Labels	Count of Result
Failed	15
Success	96
Unavailable	8
Unknown	2
Grand Total	121

Number of Defect/Enhancements Found

Row Labels	Count of Issue Type
Bug Fix	52
Enhancement	61
Grand Total	113

Severity/Priority Levels

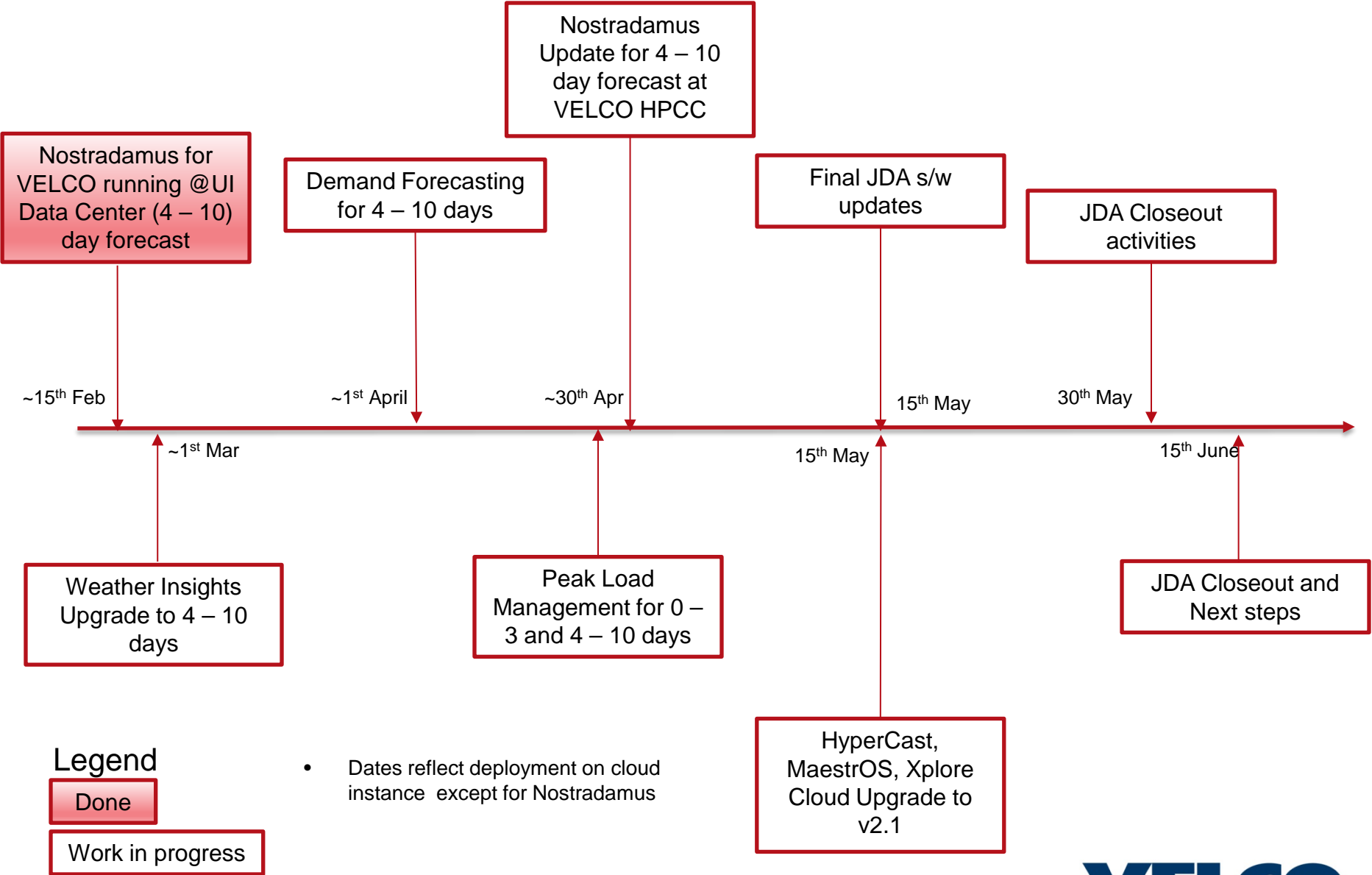
Count of Severity	Column Labels			
Row Labels	Priority 2 - High	Priority 3 - Medium	Priority 4 - Low	Grand Total
Severity 2 - High	15	2		17
Severity 3 - Medium	1	15	12	28
Severity 4 - Low		16	52	68
Grand Total	16	33	64	113

Commercial Software User Acceptance Testing

Recommendations

- *Accepted software provided by UI with the following contingencies:*
 - All High Severity and High Priority issues have been fixed, retested, verified, and closed
 - Deliver Q1 2018
 - All non-critical defects are addressed in a timely manner
 - Deliver Q1 2018 – Q3 2018
 - All agreed upon enhancements are addressed, verified, and closed
 - Deliver Q1 2018 - Q3 2018
 - 60 day test period will follow upon receipt of user documentation
 - Deliver complete user documentation in Q1 2018

2018 JDA + Product Deployment



Collaborative work summary

- Kicked off initial discussion for development of outage prediction software between VELCO and Northview Weather, LLC (Jay Shafter)
- Nowcasts provided in support of recent weather event forecasts
- Held VWAC workshop December 13th in Burlington with project stakeholders—focus on VWAC model and UI product application demonstrations
- UI product demonstration at VELCO December 14th
- VELCO developed User Acceptance Test Plan to assist with Utopus Insights products testing
- Northview Weather, LLC to present work at today's Operating Committee



The University of Vermont



