



romonet®

Case Study - Lawrence Livermore National Laboratory

Romonet helps LLNL to evaluate optimization projects to reduce energy consumption



Lawrence Livermore National Laboratory (LLNL) is self-described as “a premier research and development institution for science and technology applied to national security”. In the absence of nuclear testing, LLNL’s principal responsibility is ensuring the safety, security and reliability of the nation’s nuclear deterrent through the application of advanced science, engineering and technology, especially high performance computing. The Laboratory also applies its special expertise and multidisciplinary capabilities to preventing the proliferation and use of weapons of mass destruction, bolstering homeland security and addressing other problems of national importance, including energy and environmental security, basic science and economic competitiveness. LLNL has an annual budget of about US \$1.5 billion and a staff of roughly 7,000 employees.

Profile:

“LLNL has a mission of strengthening the United States’ security through development and application of world class science and technology



Challenge

LLNL is home to a number of the most powerful computer systems in the world, according to the TOP500 list, including Q, the world’s fastest computer from June to November 2012. Currently no. 2 on the TOP500, Sequoia is a 16.32 petaflops IBM system packing in more than 1.5 million custom power cores. The Laboratory has surpassed its goal of reducing energy consumption by 9 % by Oct. 1, 2012 according to the Energy Management Program (the actual percentage of energy decrease was 9.94 %). The energy savings and cost reduction effort is in response to Executive Orders and Department of Energy directives. As part of this directive, the LLNL team evaluated “what- if” scenarios for energy optimization of Building 112, a 15,500 sq. ft. raised floor Enterprise business service data center with a capacity of 1.11 MW. This work was done under the auspices of the US Department of Energy.

Solution

LLNL used the unique capabilities of the Romonet Software Suite alongside Syska-Hennessy (a Romonet partner) who was also brought in to model the enterprise business center using Romonet’s Energy software module. Alternatives such as DC Pro and CFD modeling were also considered but Romonet was selected

due to its “bird’s eye” view and for its ability to generate decision-making results in a very short period of time. Romonet also offered flexible “what-if” capabilities while other products are fixed and do not allow changes to the topology without major re-calculations.

Benefits

The Romonet software provided a combined view of the electrical, thermal and IT parameters in a single graph that made for easy interpretation of the information. The graphical representation of the data was used to present the results of the models to the owners, specifically the interactive view and the PUE charts.

Outcome

The Romonet software clearly pointed out variances in the metering (some of the metering was inaccurate) and was also instrumental in predicting the ROI and payback for the various alternatives being considered: consolidating Enterprise functions into a single facility, use of VFD’s on the CRAC units and use of a waterside economizer. The decision was made to implement the first two options.



“The software enabled us to analyze “what-if” scenarios for key projects and to understand their ROI before spending any money or scarce resources. This gives us quantitative information to justify our decisions to the budget holders”

Anna Maria Bailey, PE, Lawrence Livermore National Laboratory

Maintaining world-class data centers while maximizing return on investment.

Data centers are highly capital intensive and require deep engineering, operational and financial understanding and experience to be cost effective. “This software is interesting because it encompasses the capability and direction we knew we needed to evaluate internal engineering and costs models and reduce our energy spending. Like many other organizations, we relied heavily on complex spreadsheets and a lot of manual labour in order to derive the business finance information from engineering options and operational choices.” “In our situation, evaluating and recommending engineering options and operational choices are part of our commitment, ensuring we not only find but also justify solutions that maximize our returns. We knew that scaling that capability with our internal tools and resources was not going to be possible and having looked at using other alternatives found that we were not going to be able to do it within the timeframe and resource constraints.” “What LLNL needed was technology built with data center operators in mind and able to bring engineering, operations and finance together. We now have consistency of data and accuracy of output. We can compare investments on an apples-for-apples basis and thanks to the customer-ready graphical output from Romonet’s

software, we can go directly from a model of our data center to budget meetings with easy to understand and in-depth data giving our budget holders confidence in our ability to not only understand the consequences of our choices but also show their financial payback. The Romonet software has allowed us to prove that consolidating several applications in the same data center would have an immediate beneficial impact.”



Managing each investment and each site for success.

Romonet Software Suite is a suite of applications for engineering, operational and financial teams, bringing together the world of data center engineering and operations with finance. Romonet helps organizations like LLNL gain a deeper understanding of their data centers and ties almost every engineering and operational and customer decision to a financial impact. Because Romonet models the environment rather than metering it, the software can provide decision-making data before decisions are made, enabling organizations to make more informed decisions.





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