

## Vortex Critical to the Most Powerful Telescope to Map the Universe

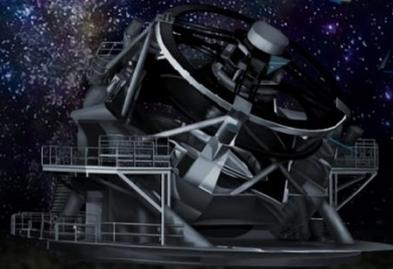
ADLINK's Vortex Intelligent Data-sharing Platform is being used in a historical attempt to draw the first 3D map of the universe.

Serving to control, monitor and regulate the data interfaces and ensuring the right data gets to the right place in real-time within the new Large Synoptic Survey Telescope (LSST) telescope facility, Vortex was chosen to process data on a colossal volume in an attempt to scale the universe generating over 30 terabytes of data 24/7.

*"It's not just that DDS makes it easier and faster for this telemetric data to be shared, analyzed and acted upon throughout the system. What Vortex provides the developers is the freedom to concentrate on the application... not on the communication."*

*"That is entirely taken care of for us with Vortex; it was specifically chosen over other DDS implementations because of its superior shared-memory architecture"*

German Schumacher,  
Software Manager, AURA



### About AURA

LSST is a project organized by the Association of Universities for Research in Astronomy (AURA) and funded by the U.S. Department of Energy and the National Science Foundation with support through a public-private partnership featuring an immense collaboration of countries, companies and universities, including more than 400 scientists and engineers.

The eight-metre-wide giant telescope will sit on top of the Chilean mountain of Cerro Pachón, it will work in tandem with the world's largest digital camera, weighing in at more than 6,000 pounds and snapping 3.2-gigapixel images every 20 seconds as it surveys the stars and generates 30 terabytes of data night after night for 10 years.

LSST has been identified as a national scientific priority in reports by diverse national panels, including several National Academy of Sciences and federal agency advisory committees.

### Key Challenges for the LSST

The data generated by the LSST will show scientists more of the universe than humanity has seen looking through all previous telescopes combined, providing 1,000 images of every part of the sky and acquiring all that scientific information involves an enormous amount of telemetry data that must be captured.

Mapping the universe is not just a colossal job, it is mission-critical operation that involves a huge amount of time and money. The mountain of data that must be captured, monitored and analyzed in order to reactively adjust and control the telescope in a 24/7 operation is astonishing, making the selection of the data-sharing backbone of the LSST critical to the success of the project.

In the case of LSST, over 96-percent uptime over a 10-year period is required to ensure there are no risks to the \$500 million program investment and no corruption of the experiment data during this timeframe. Vortex enables real-time monitoring and predictive capabilities, which will ensure the survey does not suffer disruptions in its cosmic explorations.

## Real Benefits of LSST

The data that Vortex is set to handle will come from the largest light-gathering source in the world. The LSST will zero in on some of the faintest objects in the sky and populate a database containing 20 billion objects. Beyond the pure science aspect of the project, scientists will also use LSST to track asteroids and determine whether they pose any impact threat to the earth.

The depth and detail of the incoming information will facilitate creation of a 3D map of the cosmos. LSST will also give scientists a better understanding of the solar system beyond Neptune, including distant objects in the Kuiper Belt. The data is expected to reveal just how far material extends into the outer reaches of our solar system.

For LSST, it is critical that the applications do not handle the data. Without Vortex, the developed applications would have to shoulder the tasks of message interpretation and state management.

## How Vortex Helped

Vortex is based on the Data Distribution Service (DDS) standard developed by the Object Management Group (OMG). In addition to its real-time data sharing capabilities, Vortex provides a user-friendly development environment that helps enable fast and efficient system development requiring the involvement of fewer people – without Vortex to help simplify overall system design, the team required to develop the data-sharing functionality of the system would have been three times larger than was actually needed.

A common characteristic of Vortex applications is mission-criticality, an attribute inextricably tied to a system's intolerance for failure. Since the data-sharing infrastructure impacts all aspects of a system, its reliability, robustness and fault-tolerance become synonymous with operational success.

Vortex has a proven track record of wide spectrum of applications, including smart energy, smart transportation, industrial automation, and healthcare environments. It is deployed in a variety of air-traffic control, manufacturing, financial automation, smart agriculture, grid management, smart city and financial trading systems. Vortex real-time monitoring and predictive capabilities will ensure the survey does not suffer disruptions in its cosmic explorations, securing the data, its quality and the entire equally-massive investment.

## The Future of LSST

The collaborative work of many countries, universities and companies on LSST will seek to shed light on such phenomena as dark matter and dark energy, providing clues to the nature and origin of the universe.

With the help of Vortex data-sharing capabilities, LSST will manage to transmit huge flow of data from the heavens and map the universe in 3D that will be made available to over 400 scientists and engineers all over the world in real-time for the entire 10-year project life span.

## For More Information

For further information regarding how to upgrade to Vortex, then please e-mail: [ist\\_info@adlinktech.com](mailto:ist_info@adlinktech.com) or visit: [ist.adlinktech.com](http://ist.adlinktech.com)



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