A Large Ion Collider Experiment (ALICE)
TExAS LEARNING & COMPUTATION CENTER
A LARGE ION COLLIDER EXPERIMENT (ALICE)

ALICE is one of three major international experiments at CERN in Geneva, Switzerland, home to the Large Hadron Collider. In ALICE, the LHC will collide lead (Pb) ions to recreate conditions just after the Big Bang under laboratory conditions. The data obtained will allow physicists to study a state of matter known as quark-gluon plasma, which is believed to have existed within the first microsecond of the universe.

In 2004, TLC\(^2\) was one of the first computational centers to join the ALICE grid, and during the first large-scale grid data challenge in 2006, TLC\(^2\) was the second largest contributor of computational resources. For the last three years, TLC\(^2\) has been in the top 15 contributors of computing time and power, accounting for 78 percent of the total US contribution. In this time, ALICE has doubled its computing capacity each year, with 85 sites on five continents running approximately 12,000 CPU hours.

Individual raw Pb-Pb events from the ALICE detector may exceed 20 MB in size and will be read from the detector at rates approaching several hundred per second. The Pb-Pb running will take place typically for a one month period annually, during which the data-taking will be more or less continuous. The volume of data and the subsequent analyzed information will amount to many tens of PB annually, and the computing power necessary to perform the analysis will require a distributed infrastructure.

Software, including middleware to support a grid-like environment, has been developed over the past decade. Many rounds of simulated data challenges have been performed to validate the software and the infrastructure models. Now the machine is in the process of being commissioned and this computing infrastructure is approaching full operational status. ALICE will also run for up to 10 months a year taking data from proton-proton collisions as well, adding to the overall computing load, but at a much reduced level in comparison to the Pb-Pb running.

Dr. Lawrence Pinsky is a member of the ALICE-USA Collaboration and has served as the Computing Coordinator for that effort. He is a member of the ALICE Computing Board and the CERN Grid Deployment Board.

TLC\(^2\)’s contribution to the ALICE project is made possible through RENoH, the Research and Education Network of Houston, created by a partnership between TLC\(^2\) and AboveNet, and through TLC\(^2\) computing and storage resources.

RENoH provides 500+ dark fiber miles which connect Houston area institutions of higher education (including UH) with each other and the national high-performance backbone networks, the National Lambda Rail (NLR) and Internet2, at 10Gb/sec.

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