The 20 Tera Flop Erasmus Computing Grid (ECG)

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with

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Introduction

Hogeschool Rotterdam
RIVIO Campus

Erasmus Medical Center
Faculty Tower

To meet the enormous computational needs of live-science scientific research as well as clinical diagnostics and treatment at the

Hogeschool Rotterdam and the Erasmus Medical Center

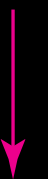
both are currently setting up in an interdisciplinary approach one of the largest desktop computing grids in the world – The Erasmus Computing Grid. The Hogeschool Rotterdam has a capacity of ~4000 desktop computers and the Erasmus Medical Center has a capacity of ~9000 desktop computers, i. e. ~ 20 Tera flops. These computers are located in different networks and even building throughout the city of Rotterdam with a ~8000 desktop computers located within 500m of the Museums Park campus area and connected by optical fibers. The operating systems range from Windows 2000 and Windows XP to Linux and Mac OS driven systems, and are especially diverse at the faculty building of the Erasmus Medical Center. Different usage scenarios and management strategies apply as well in both institutions. Nevertheless, the computers are available for computations 99 % of the time!

Results

The Erasmus Computing Grid is based on the Condor middleware. An own developed management system allows easy installation and management of all the computers in the system. The system was set-up in a way that security and privacy issues, which are especially important for the Erasmus Medical Center are always guarantied. Currently, the Erasmus Computing Grid has reached a capacity of 3 Tera flops. 4 user groups are either in production or testing of their algorithms. Around 15 different user groups are heading towards using the grid in the near future. Expansions are planned.

Goal

current
3 Tera Flops
2006



20 Tera Flops

2007

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Abstract

The Set-Up of the 20 Teraflop Erasmus Computing Grid: To meet the enormous computational needs of live-science research as well as clinical diagnostics and treatment the Hogeschool Rotterdam and the Erasmus Medical Center are currently setting up one of the largest desktop computing grids in the world – The Erasmus Computing Grid. Currently 3 Tera flops are operational and in early production, installation up to the today available maximum capacity of 20 Tera flops in both institutions is planned and partly underway. Thus the Erasmus Computing Grid transforms the existing and sustained huge computer capacity available into usable form via a reliable and secure installing and management system, so that the academic and industrial opportunities depending on such huge computing capacities can be realized for the benefit of society.

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Keywords:

Genome, genomics, genome organization, genome architecture, structural sequencing, architectural sequencing, systems genomics, coevolution, holistic genetics, genome mechanics, genome function, genetics, gene regulation, replication, transcription, repair, homologous recombination, simultaneous co-transfection, cell division, mitosis, metaphase, interphase, cell nucleus, nuclear structure, nuclear organization, chromatin density distribution, nuclear morphology, chromosome territories, subchromosomal domains, chromatin loop aggregates, chromatin rosettes, chromatin loops, chromatin fibre, chromatin density, persistence length, spatial distance measurement, histones, H1.0, H2A, H2B, H3, H4, mH2A1.2, DNA sequence, complete sequenced genomes, molecular transport, obstructed diffusion, anomalous diffusion, percolation, long-range correlations, fractal analysis, scaling analysis, exact yard-stick dimension, box-counting dimension, lacunarity dimension, local nuclear dimension, nuclear diffuseness, parallel super computing, grid computing, volunteer computing, Brownian Dynamics, Monte Carlo, fluorescence in situ hybridization, confocal laser scanning microscopy, fluorescence correlation spectroscopy, super resolution microscopy, spatial precision distance microscopy, auto-fluorescent proteins, CFP, GFP, YFP, DsRed, fusion protein, in vivo labelling, information browser, visual data base access, holistic viewing system, integrative data management, extreme visualization, three-dimensional virtual environment, virtual paper tool.

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