

Measuring HPCS Productivity Lawrence Votta

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PRODUCTIVITY
= OUTPUT / UNIT
EFFORT

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*Well, according to theoretical biology, it
should exist.*

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Purpose-Based HPC
Benchmarks
HPC

Segment

Electronic Design
Nuclear Applications
Mechanical Engineering
Crash Simulation
Fluid Dynamics
Weather/Climate
Life Sciences
Signal/Image Processing
Financial Modeling
Petroleum

Task

Design and test an N-bit adder
Simulate radiation transfer
Design truss to bear given load
Track elastic object in collision
Find vehicle drag coefficient
Predict weather for N days
Fold chain of N peptides
Process & archive satellite data
Predict/act on financial events
Manage petroleum reservoir

Objective

Maximize N, minimize area
Minimize radiation variation
Minimize truss weight
Minimize payload deformation
Minimize air drag
Minimize forecast error

Maximize length of peptide
Maximize image availability
Maximize profit
Maximize oil extracted

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Summary

Purpose Based Benchmarks
Credible Empirical Techniques
Software Engineering
Social Sciences
Physical Sciences
Embedded Know How In The
HPCS and
University Communities
Measuring HPCS

Productivity

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