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Grid Computing with Dyalog

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The Problem

- Our customer example
  - ✓Full simulation task requires 5 days and 8 hours to calculate
  - ✓Simplified simulation task requires 8 hours
- Results are needed by NOW
- He runs only the simplified task on his PC

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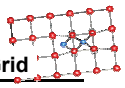
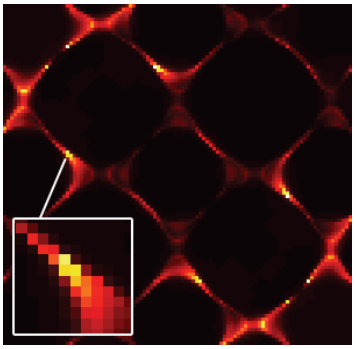
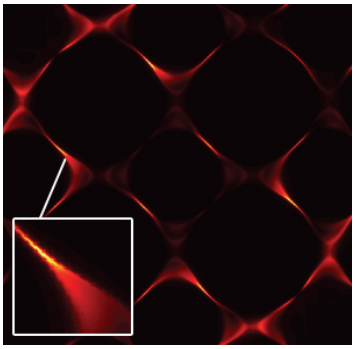
GRIDPower



Intel(R) Pentium(R) 4 CPU 2.80GHz



350 equal PCs in a Grid



Resolution:	40.000 pixels	**16x: 640.000 pixels**
Elapsed time:	**8 hours**	**23 Minutes**

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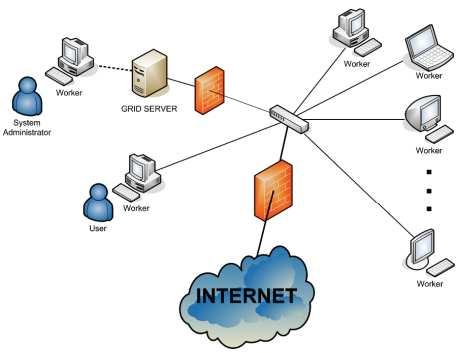
Techila Creates a Supercomputer from Your PCs

- **Less than 5% of PC's capacity is in use / 95% of capacity is wasted**
- **Techila GRID harnesses the 95% of unused PC capacity to create instant positive bottom line impact**
- **Distribute computation from servers to PCs**
  - ✓Run in the background
  - ✓Normal use of PC not disturbed
- **100x … 500x … 1000x … 5000x FASTER**

Techila GRID



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Techila Benefits

- Results in minutes instead of hour
  - ✓ **Cost savings**
  - ✓ **Enabler of new things**
  - ✓ **Source of competitive advantage**
  - ✓ **Time-to-market**

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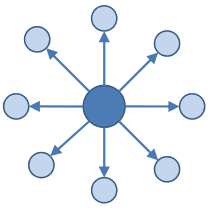
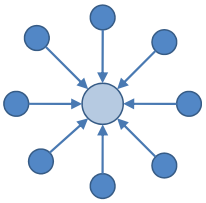
Why it works so well ?

- **In Techila's solution also the clients are intelligent**
  - ✓ **Drastically Less network traffic.**
  - ✓ **Self-healing - discovering, diagnosing, and preventing disruptions.**
  - ✓ **Self-optimisation - tuning resource usage and improving workload balancing.**
  - ✓ **Self-protection - detecting, identifying and protecting against failure and security attacks.**

Server centric solution, where all of the intelligence is built on the server side.



Client centric solution, where intelligence is distributed.



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Examples of Potential Customer Problems

- **Financial Services** → Portfolio modeling, stochastic valuation reporting, risk analysis and asset liability management - speed up analysis and improve critical decision making
- **Oil & Gas + Mining Industries** → Reservoir modeling, 2D & 3D seismic processing, and horizontal drilling benefit - increase project scope and improve accuracy of data analysis
- **Industrial Engineering** → Supply chain, logistics, and plant and process modeling, simulation and optimization - achieve dramatically higher return on capital

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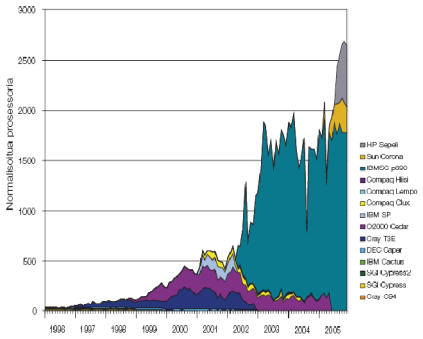
The Need for Capacity

- **Simulation, modeling and data analysis require even more capacity**
- **Compliance is a key driver:**
  - ✓ C3 Phase II in the US
  - ✓ Basel 2 in the EU
  - ✓ Solvency 2 in the EU
- **Typical need exceeds supply**
- **”We must manage with the capacity we have”**

The need for capacity



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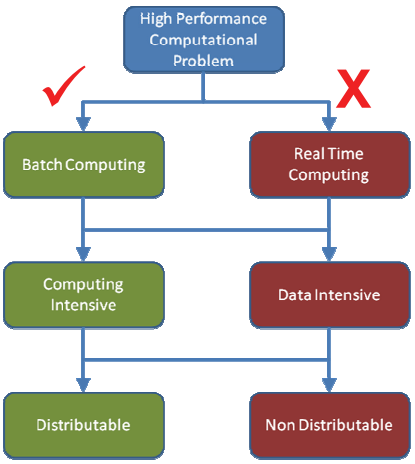
What to gridify?

- PC grid is best fit for computing intensive batch runs
- If a task is very data intensive with little CPU activity the PC grid does not offer optimal solution
- Simulation, modeling and data analysis are very good candidates to gridify

- Monte Carlo Simulation =



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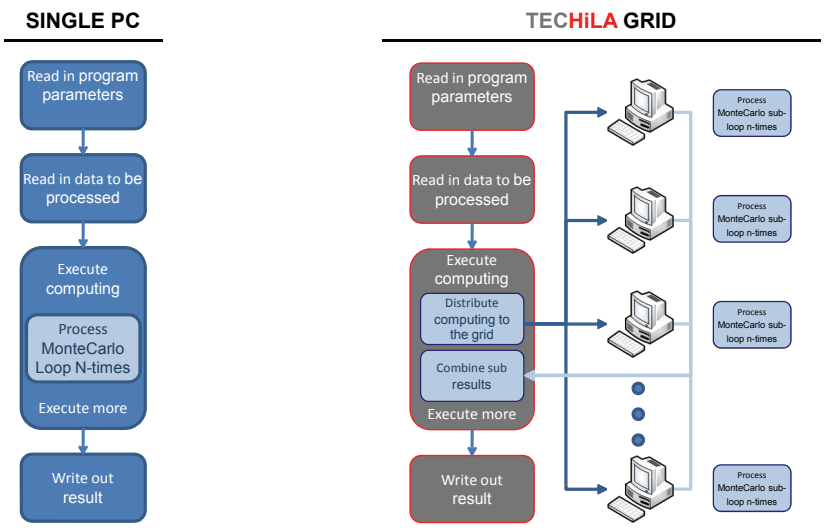
How to gridify ?



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Gridifying Monte Carlo simulation

Computing Pi with 1 billion iteration in a server	Computing Pi with 1 billion iteration in 100 computer grid

The server executes:
 	
SUM=0;
 	
// 1 billion iterations
COUNT=1000000000;
FOR I=0 TO COUNT
DO
X=RANDOM();
Y=(1-X^2)^0.5;
SUM=SUM+Y;
DONE
PI=4*SUM/COUNT;
	100 clients execute:
	
	SUMx=0;
	
	// 10 million per client, total 1 billion iterations
	COUNT=10000000;
	FOR I=0 TO COUNT
	DO
	X=RANDOM();
	Y=(1-X^2)^0.5;
	SUMx=SUMx+Y;
	DONE
	RETURN SUMx;
	
	Grid server executes:
	// the sum of the "SUMxs"
	SUM=SUM1+SUM2+…;
	// the sum of the "COUNTs"
	COUNT=COUNT1+COUNT2+…;
	PI=4*SUM/COUNT;

Time to execute: 1 hour	Time to execute: 36 seconds

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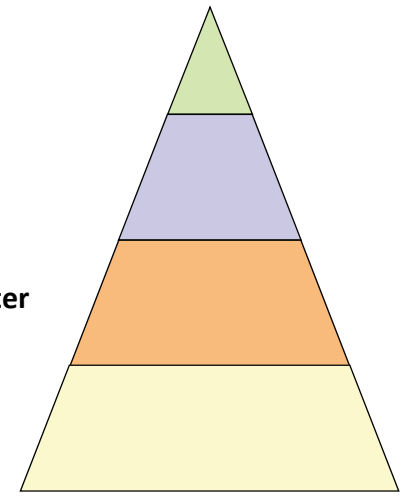
Co Operation with Dyalog

- First gridified at application level
- Next at software product level
- Targeting to gridify at APL interpreter level
- Improving the ease-of-use



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DEMO

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ThankYou!