

emGine Environment for Microwave Engineering

Parametric Studies,
Optimizations
and
Genetic Generations

June 2009



What is emGine Environment?

emGine Environment
is a rigorous
3-D electromagnetic simulator

It solves the full-wave Maxwell's equations
in time-domain

Use it for analysis, design, optimizations and
generations of microwave circuits and antennas

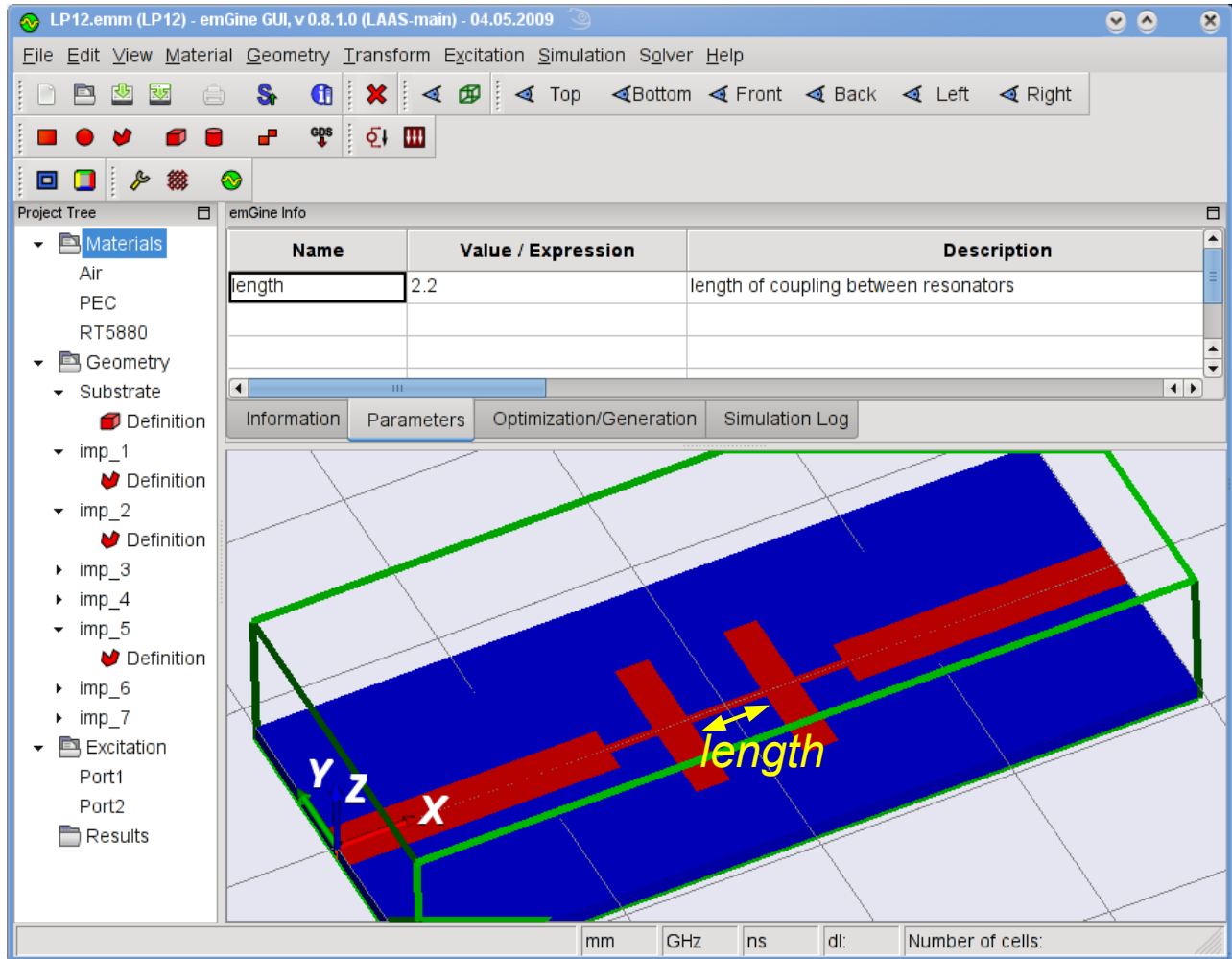


Parametric Studies and Optimizations

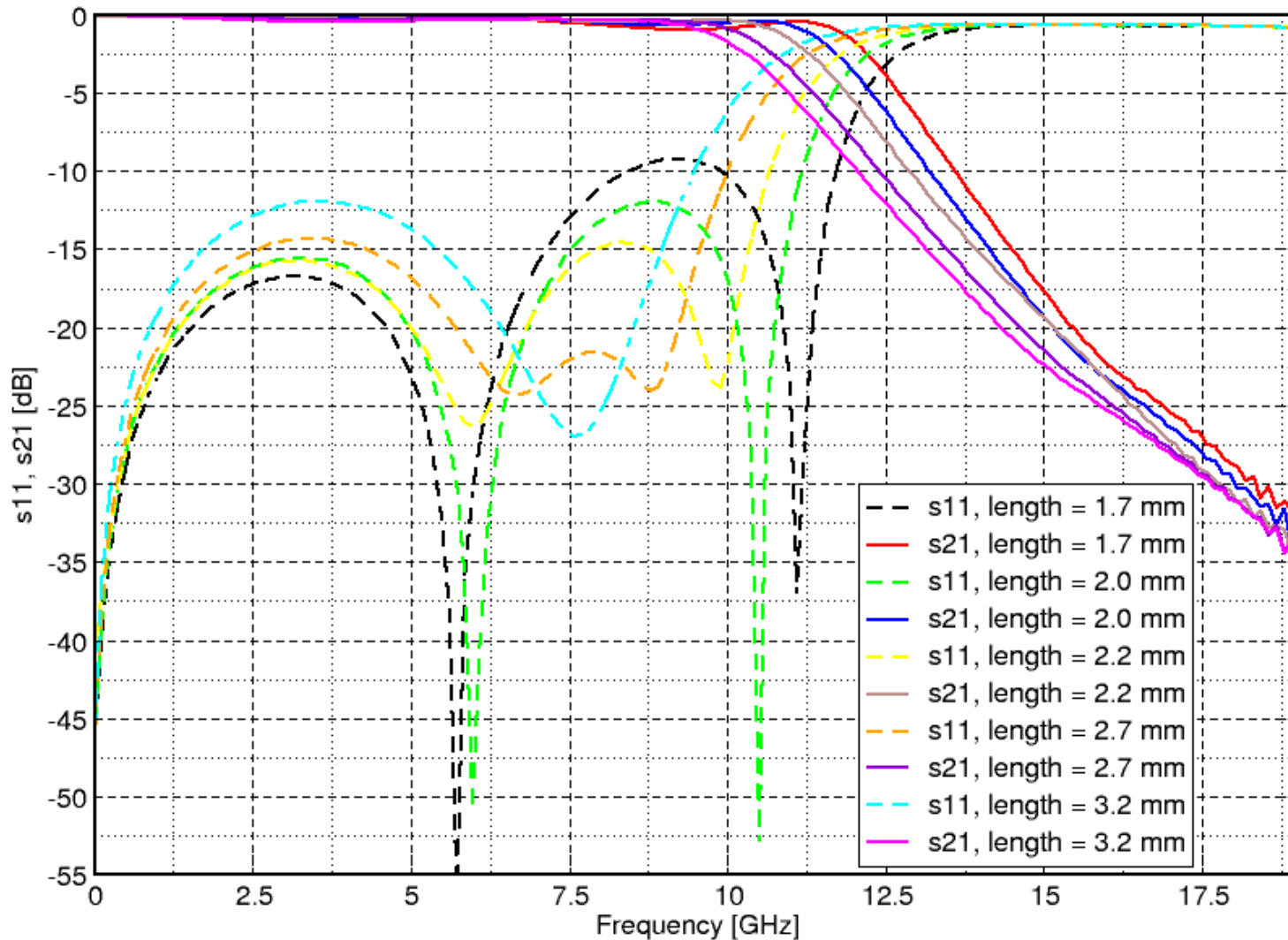
Case 1

Parametric Study of a Microstrip Filter

- Low-pass filter with coupled resonators – GDSII imported structure
- RT5880 substrate material, $h = 20$ mil
- Parameter: *length*
- Study of the influence of the coupling on the frequency shift (de-tuning)
- *length* varied from 1.7 mm to 3.2 mm



Parametric Study of a Microstrip Filter - influence of the *length* parameter



Genetic Generations of Microwave Structures

Case 2

NEW

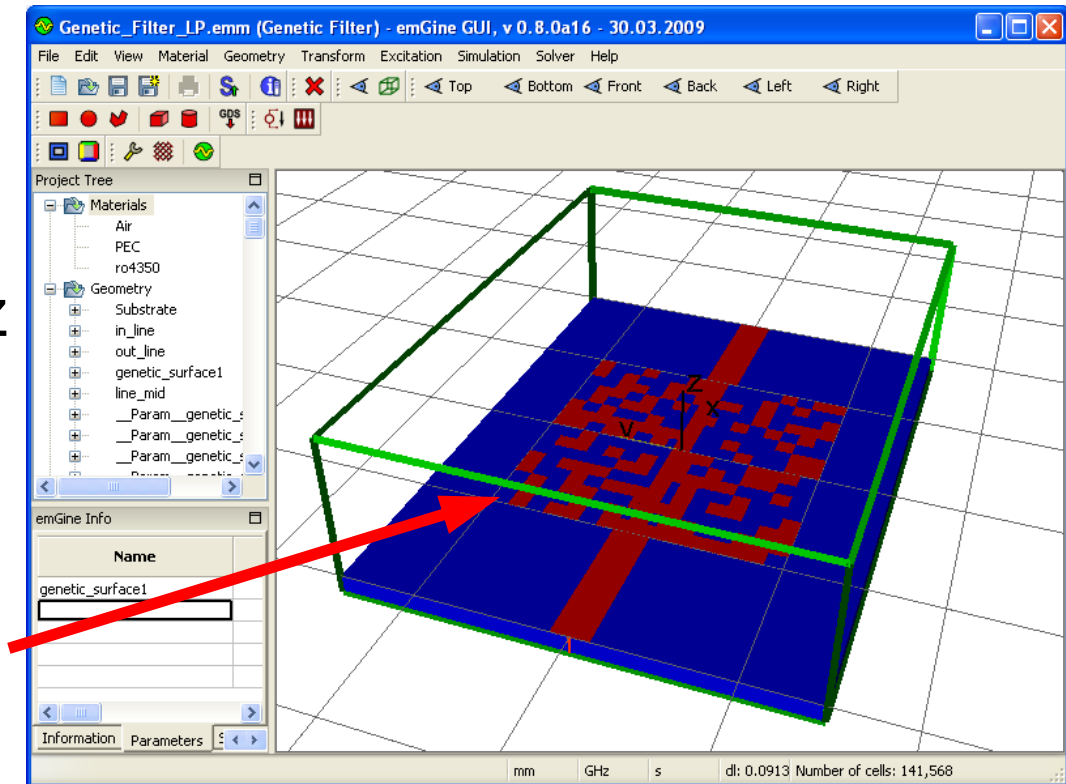
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UNIQUE ON THE MARKET TODAY!

Genetic Generation of LP Filter

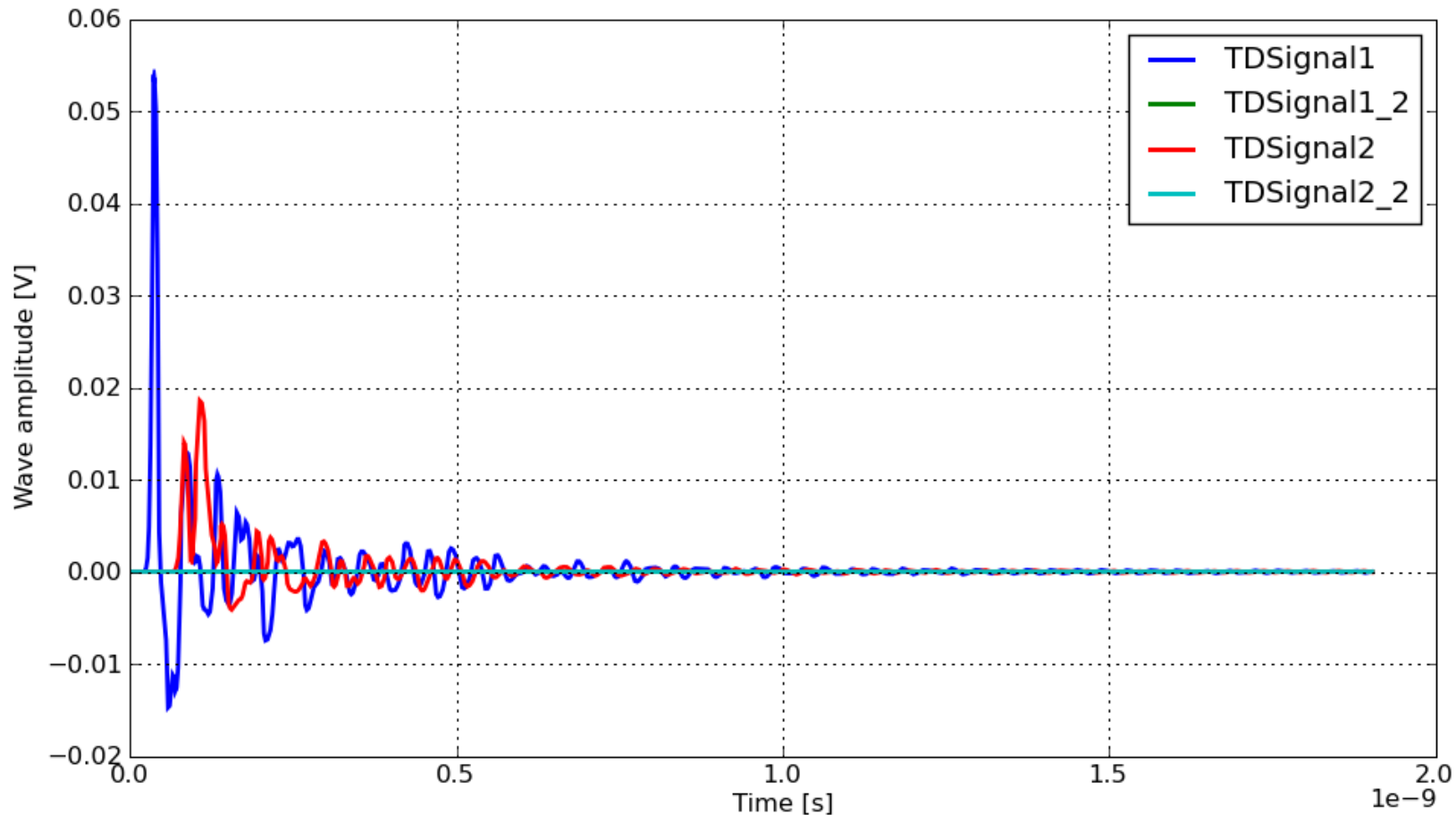
- **Goal:** Generate a DC-coupled (for biasing) low-pass filter for a narrow-band 50 Ω matched amplifier
- Freq. of operation: 10 GHz
- Max. suppression @ 1st harmonic freq.: 20 GHz

Result:
Genetically generated
EM structure



Genetic Generation of LP Filter Time-Domain Signals (Voltages)

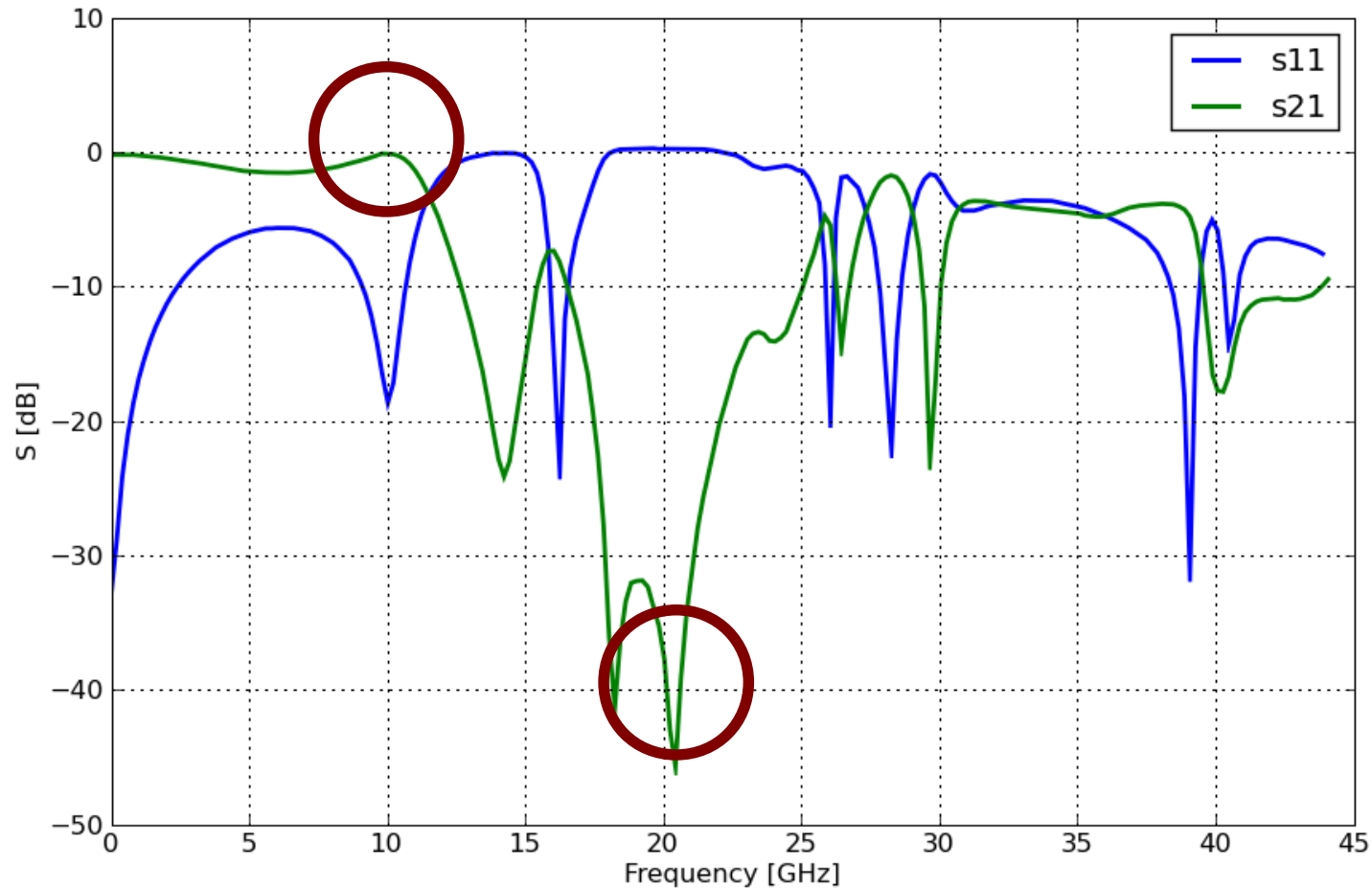
Incoming and transmitted voltage signals at the structure ports



Genetic Generation of LP Filter

S-Parameters (dB) of the generated filter

S-parameters of the generated filter structure which satisfies the prescribed goals

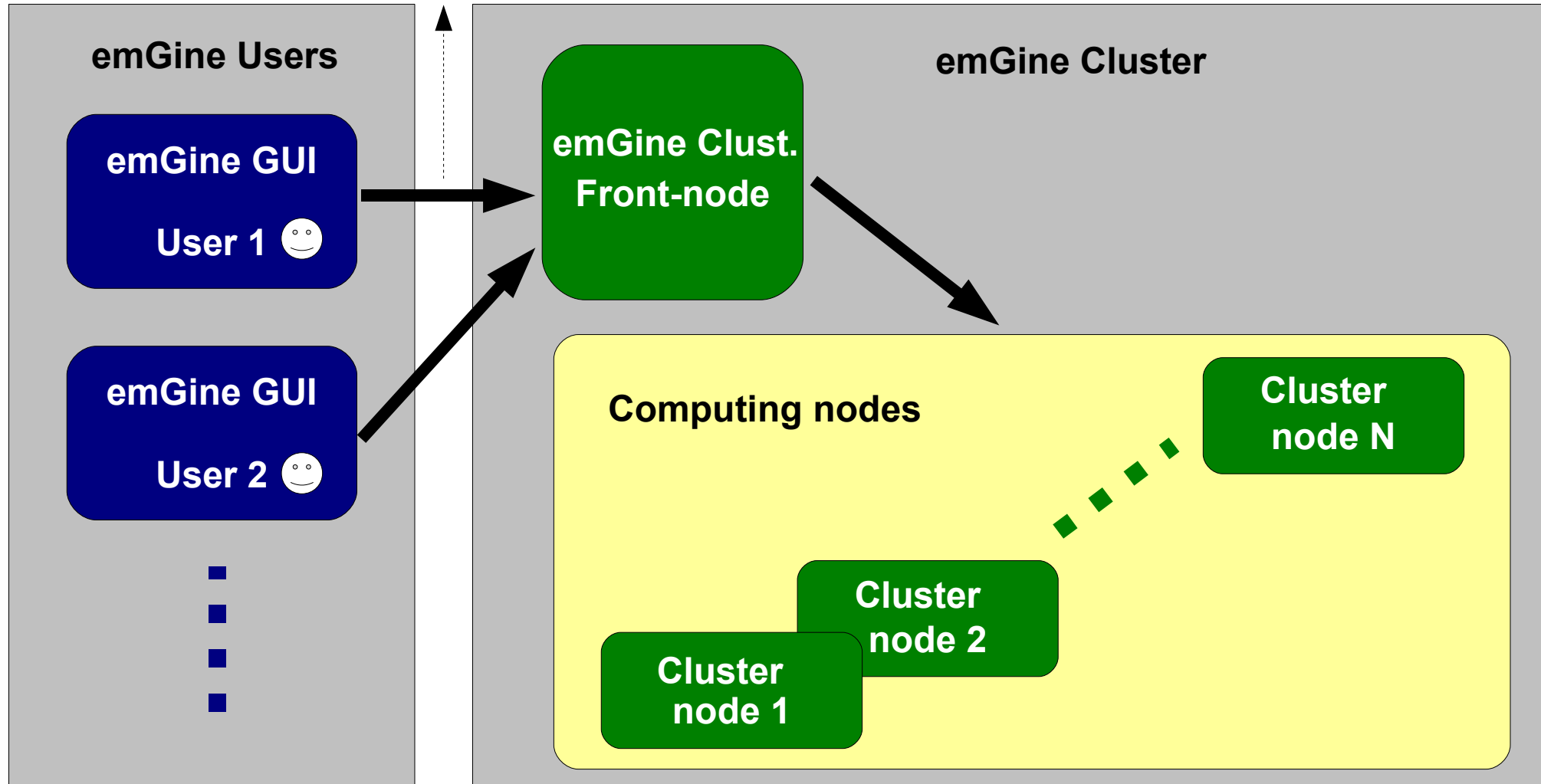


Cluster Computing with emGine Environment

emGine Cluster = option for fast optimizations

Cluster Computing with emGine Environment – speeding up simulations

LAN/Remote/Internet connection to emGine Cluster conveniently from the emGine GUI



Conclusions

emGine Environment Conclusions

- Rigorous 3-D full-wave electromagnetic simulator in time-domain
- Supports Windows XP / Vista / Linux / Unix / MacOS X
- **Genetic generations of EM structures – UNIQUE ON THE MARKET !**
- Cluster computing option speeds up tremendously design, optimizations and generations
 - Large parametric studies possible
 - Fast optimizations

Interested?

Then contact us for a testing version today!

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<http://www.petr-lorenz.com>