# Benchmarks | Brazil 138 kV and Above Power System

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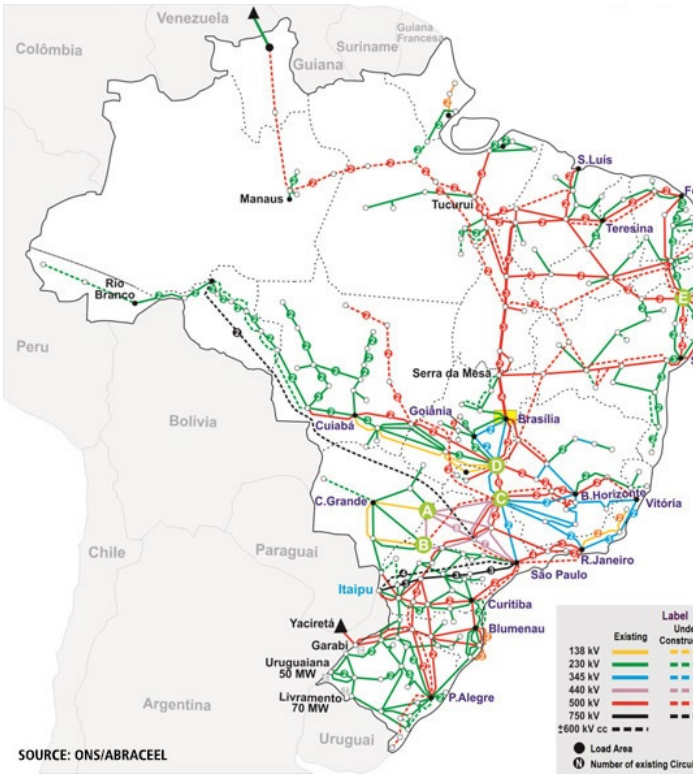
| **Model name** | **Brazil 138 kV and above power system** |
| **Minimum license required** | **HXG Max (6 cores)** |
| **Highlights** | • Largest available benchmark<br>• Several computationally demanding components<br>  • 8 DC links<br>  • 85 nonlinear transformers<br><br>HYPERSIM automatically parallelizes the network into 497 tasks and distribute all available cores for maximum speed |
| **Model diagram** |  |
| **Single-phase nodes** | 2542 |
| **Sources (3)** | 42 |
| **Transformers (3)** | 109 (24 linear, 85 nonlinear) |
| **HVDC converters (12-pulse valve groups)** | 16 |
| **Single-circuit lines (3, Bergeron model)** | 374 |
| **Single-circuit lines (3, Frequency Dependent model)** | 6 |
| **Hardware** | **OP5707XG**<br><br>• **Motherboard:** SuperMicro X11DPL-i<br>• **Processor:** Intel(R) Xeon(R) Gold 5222 CPU @ 3.80GHz; 8 cores<br>• **RAM:** 32 GB |
| **Software** | • **Platform:** HYPERSIM<br>• **Compiler:** Intel 2019 (19.03.199) |

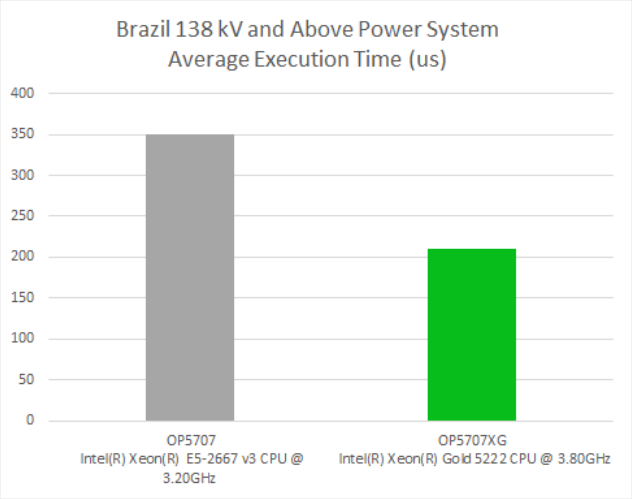
**Results**

- **Number of core(s):** 6
- **Minimum time-step:** 45 us *
- **Total average execution time (sum on all cores):** 210.6 us

* Performance under transient conditions varying considerably depending on t
type, this benchmark measures the minimum achievable time-step without ove
steady-sate conditions. A rule of thumb is to consider 10 to 20 % buffer time fo
calculations under transient conditions.

**Benchmark**

**Performance comparison between new (OP5707XG) and previous (OP5700) hardware generations**




66%

Speed Increas