An Efficient Parallel Implicit Solver for LOD-FDTD Algorithm in Cloud Computing Environment

ABSTRACT

- This letter presents an efficient parallel algorithm for solving locally one dimensional (LOD) finite difference time domain (FDTD) in cloud computing environment.
- As opposed to existing LOD-FDTD algorithm parallelization scheme, the proposed method solves the implicit tridiagonal system in parallel by using Sherman-Morrison formula to decompose the tridiagonal matrix into smaller matrices.
- The parallel nodes in cloud computers solve the matrices simultaneously.

EXISTING SYSTEM

- **C**OMPLEX electromagnetic environment simulations are performed traditionally on supercomputers , whichcare not feasibly accessed.
- Cloud computing offers a more economic way to utilize more computing resources.
- The hardware architectures of them are similar in many aspects, except that supercomputers are connected by tailor-made inter node communication networks , while cloud computers are connected by a switch with limited bandwidth.

PROPOSED SYSTEM

- We use LOD-FDTD algorithm parallelization scheme, the proposed method solves the implicit tri-diagonal system in parallel by using Sherman-Morrison formula to decompose the tri-diagonal matrix into smaller matrices. The parallel nodes in cloud computers solve the matrices simultaneously.
- In our method, determinant computation is avoided and data transferring among cloud computer nodes is minimized so that good parallelization scalability is obtained.
- LOD-FDTD algorithm is an efficient method to reduce the number of iterations while the increased error does not become prohibitive, thus suitable for complex electromagnetic environment simulations.

HARDWARE REQUIREMENTS

- Processor - Pentium –III
- Speed - 1.1 Ghz
- RAM - 256 MB(min)
- Hard Disk - 20 GB
- Floppy Drive - 1.44 MB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS

- Operating System : Windows 8
- Front End : Java /DOTNET
- Database : Mysql/HEIDISQL

CONCLUSION

- We proposes a high efficiency parallel LOD-FDTD algorithm.
- The parallelization is done by solving implicit system in parallel.
- Our parallelization scheme needs less data communication with nodes than the DD methods, which is more suitable to be deployed in cloud computation environment.

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