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DOCOMO Beijing Labs Reduces Development Time of Mobile Communications Technology by 50 Percent with MATLAB

*Parallel Computing Toolbox Used for Scalable Simulation of
New Physical Layer Technologies*

NATICK, Mass. – January 17, 2012—[MathWorks](#) today announced that [DOCOMO Beijing Communications Laboratories Co., Ltd.](#) (DOCOMO Beijing Labs) has adopted [MATLAB](#) to develop and verify algorithms for the development of new physical layer mobile communications technologies for advanced standards such as LTE-A. MATLAB has allowed DOCOMO Beijing Labs to cut development time by 50% compared with its previous C and C++ development methods, and allowed researchers to rapidly develop new algorithms for link-level and system-level simulations.

To verify advanced algorithms developed in MATLAB, the DOCOMO engineers used a simulation frame that was built on a complete transmit-and-receive chain using MATLAB, [Signal Processing Toolbox](#) and [Communications System Toolbox](#). The team then used [Parallel Computing Toolbox](#) to parallelize communications algorithms and scale them without code changes to a 32-core cluster running [MATLAB Distributed Computing Server](#), reducing the time for the completion of extensive simulations from weeks to hours. This speed up has helped to verify more than four times the test cases, parameter settings, and operating scenarios than was previously possible. This workflow has helped DOCOMO researchers increase confidence in the robustness of their designs.

“With MATLAB we spend less time coding and more time developing innovative mobile communications algorithms,” said a lead research engineer at DOCOMO Beijing Labs. “More importantly, with only minor modifications we can accelerate the simulation of algorithms on our computing cluster to thoroughly evaluate and verify them under a wide range of operating conditions and scenarios.”

“The work at DOCOMO Beijing Labs directly influences the development of future wireless standards worldwide,” said Arun Mulpur, communications, electronics, and semiconductors industry marketing manager at MathWorks. “MATLAB has helped these researchers and engineers explore new ideas and theories, develop algorithms and systems, and functionally verify their designs.”

DOCOMO Beijing Labs relies on Monte Carlo simulations that test a range of scenarios and parameter values for dozens of base stations and hundreds of mobile devices. The researchers need to perform multiple simulations that are computationally intensive and take weeks to run on a single computer. Parallel Computing Toolbox and MATLAB Distributed Computing Server eased the task of distributing simulations on their cluster and aggregating the results, helping quickly compare the performance of different algorithms, assess robustness in poor channel conditions, and evaluate throughput across the network and at the cell edge.

DOCOMO Beijing Labs recently demonstrated a hardware implementation of two designs developed and verified using MATLAB: an 8x8 MIMO OFDM system and a multiuser MIMO for TD-LTE.

More details on DOCOMO Beijing Lab's use of parallel computing with MATLAB can be found in the user story, "[DOCOMO Beijing Labs Accelerates the Development of Mobile Communications Technology](#)."

About DOCOMO Beijing Labs

DOCOMO Beijing Communications Laboratories Co., Ltd. was founded on Nov. 2003 in Beijing, Zhongguancun Science and Technology Park, and it's wholly-owned by NTT DOCOMO. In order to promote scientific and technological innovations within DOCOMO, experts from a variety of backgrounds and disciplines work together and contribute to a plethora of innovative research activities. The company is focused on advanced research in high speed and high capacity wireless transmission technologies, contributing to global mobile communications. The overall purpose of the foundation is to establish closer connections between two countries to realize the full potential of future mobile and personal communication technologies in 4G and beyond. DOCOMO Beijing Labs has been working on LTE, IMT-Advanced, and beyond, developing system control technology and serving to achieve NTT DOCOMO's ultimate purpose: "Shift from communications infrastructure to lifestyle infrastructure."

About MathWorks

MathWorks is the leading developer of mathematical computing software. MATLAB, the language of technical computing, is a programming environment for algorithm development, data analysis, visualization, and numeric computation. Simulink is a graphical environment for simulation and Model-Based Design of multidomain dynamic and embedded systems. Engineers and scientists worldwide rely on these product families to accelerate the pace of discovery, innovation, and development in automotive, aerospace, electronics, financial services, biotech-pharmaceutical, and other industries. MathWorks products are also fundamental teaching and research tools in the world's universities and learning institutions. Founded in 1984, MathWorks employs more than 2200 people in 15 countries, with headquarters in Natick, Massachusetts, USA. For additional information, visit www.mathworks.com.

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