

ACCELERATING GRAPH DATABASES WITH THE ALVEO™ U55C CARD

INTRODUCTION

Data engineers, data scientists, and data analysts are constantly searching for correlations in data to solve real-world business problems.

Tabular and unstructured databases do not focus on relationships -- making it difficult to understand behaviors and unlock predictions; and waste countless hours for data scientists searching for answers in siloed data.

Graph analytics makes data relationships the focus, quickly delivering insights that were previously expensive and difficult to obtain.

The next frontier is obtaining those answers in real-time.

ACCELERATING GRAPH ANALYTICS

The Alveo U55C is able to accelerate query times and predictions for recommendation engines from minutes down to milliseconds. The U55Cs superior computational power and memory bandwidth enable graph query speeds up to **96x faster** compared to CPU-based clusters, while increasing the quality of scores by up to **35%**. This improvement results in greater confidence, dramatically lowering false positives to low single digits.

THE ALVEO U55C
CARD ADVANTAGE

Built from the ground up to deliver the best performance-per-watt for HPC and Big Data workloads, the [Alveo™ U55C accelerator card](#) delivers the efficiency and scalability called for by the most demanding applications.

The U55C delivers dense compute and HBM, with onboard 200Gbps networking enabling massive scale-out using Xilinx's groundbreaking open-standards based clustering.

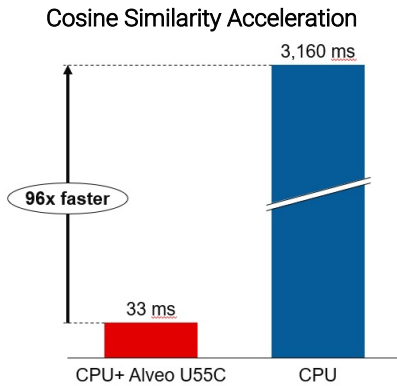
The U55C harnesses the power of Xilinx Adaptive Computing to deliver extraordinary performance unmatched by competing architectures, with:

- Data pipeline hyperparallelism
- Superior memory management
- Optimized data movement



REAL-TIME RESULTS DEMAND XILINX ACCELERATION

[TigerGraph](#), the world's most scalable graph database, turned to Xilinx to deliver enhanced performance for their most time-sensitive applications. TigerGraph tapped in to the Alveo U55C's massive parallel processing ability to deliver the computational power necessary to dramatically accelerate the two most prolific algorithms that drive graph-based recommendation engines: **Cosine Similarity** and **Louvain Modularity**.



Patient data size per card: 18M per card

PRODUCT RECOMMENDATION

**Real-time Personalized Patient Care.
96x Faster on Xilinx.**

Using the **Xilinx Cosine Similarity Vitis Library** the Alveo U55C card performed **96x faster** than a CPU running the TigerGraph Cosine Similarity recommendation engine across millions of patient records to deliver results in milliseconds.

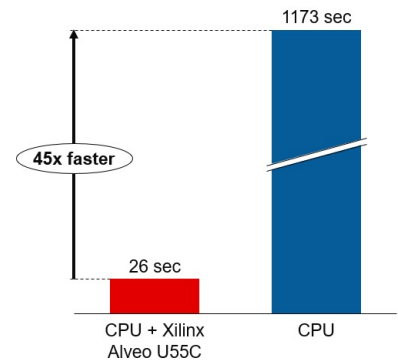
FRAUD DETECTION

**Real-time Fraud Detection.
45x Faster on Xilinx.**

Using the **Xilinx Louvain Modularity Vitis Library**, the TigerGraph fraud detection system leveraged the Louvain community detection algorithm to detect fraudsters and money launderers across hundreds of bank accounts in real-time.

In this benchmark, the Alveo U55C card provides **45x** acceleration performance over a CPU.

Louvain Modularity Acceleration



No of Vertices: 125 Million
Cluster score: 18%

CPU Info: single node with 128 cores, 256 CPUs and 512 GB memory

TAKE THE NEXT STEP

Learn more about the Alveo U55C data center accelerator card > www.xilinx.com/AlveoU55C

Corporate Headquarters

Xilinx, Inc.
2100 Logic Drive
San Jose, CA 95124
USA
Tel: 408-559-7778
www.xilinx.com

Europe

Xilinx Europe
Bianconi Avenue
Citywest Business Campus
Saggart, County Dublin
Ireland
Tel: +353-1-464-0311
www.xilinx.com

Japan

Xilinx K.K.
Art Village Osaki Central Tower 4F
1-2-2 Osaki, Shinagawa-ku
Tokyo 141-0032 Japan
Tel: +81-3-6744-7777
japan.xilinx.com

Asia Pacific Pte. Ltd.

Xilinx, Asia Pacific
5 Changi Business Park
Singapore 486040
Tel: +65-6407-3000
www.xilinx.com

India

Xilinx India Technology
Services Pvt. Ltd.
Block A, B & C, 8th, 12th and 13th Floors,
Meenakshi Tech Park, Survey No. 39,
Gachibowli (V), Serilingampally (M),
Hyderabad - 500 084 India
Tel: +91-40-6721-4747
www.xilinx.com



© Copyright 2021 Xilinx, Inc. Xilinx, the Xilinx logo, Alveo, Artix, Kintex, Spartan, Versal, Virtex, Vivado, Zynq, and other designated brands included herein are trademarks of Xilinx in the United States and other countries. All other trademarks are the property of their respective owners.

Printed in the U.S.A. LB1121