IN-MEMORY COMPUTING: UNLOCKING THE DIGITAL FUTURE

Abe Kleinfeld

President & CEO, GridGain

Digital Transformation

Digital Transformation is the transformation of business by revamping the business strategy by adopting digital technologies.

This accelerates sales and growth of the business from end to end.

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Enterprise Computing: The Old Goal

- Productivity and Cost Reduction
  - Automate routine tasks
    - Less errors
    - Less cost
  - Tools that aid office work
    - Communication tools
    - Office automation

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Enterprise Computing: The New Goal

- Competitive Advantage and New Business Opportunities
  - Digitize the physical world
    - Competitive advantage
      - Improved customer experience
      - Automate complex decision making
    - New Business Opportunities
      - Achieve new revenues streams
      - Real time situational awareness

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In many ways, what's happening is…

Rather than adopting technology to optimize the capabilities of our business (1960's to 2010's)

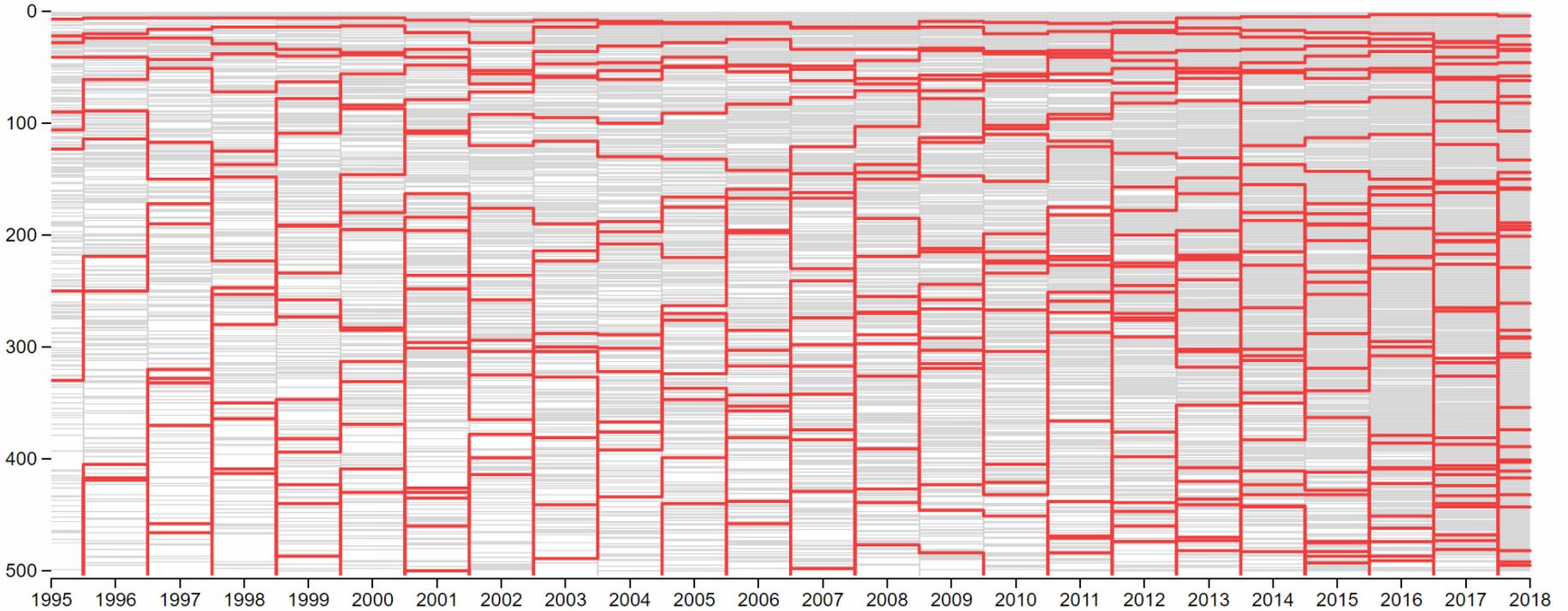We are now adapting our businesses to optimize for the capabilities of technology

"40 percent of all technology spending will go toward digital transformations, with enterprises spending in excess of $2 trillion in 2019"

Fortune 500 Tech Invasion

Tech Companies Rank History

Design and development by Nicolas Rapp for Fortune

"We want to be a tech company with a banking license"
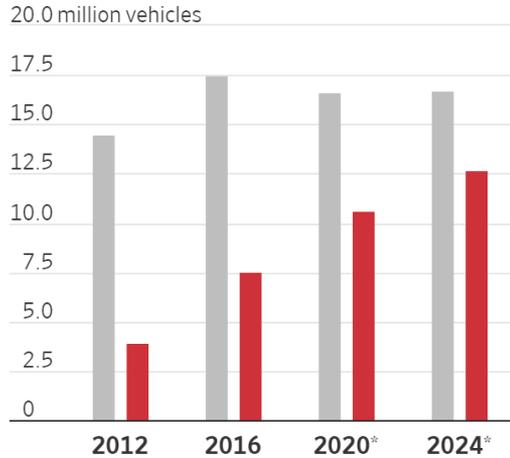
Ralph Hamers, CEO

ING

Connected Cars

McKinsey & Co. estimates monetizing data from connected cars will be worth up to $750 billion by 2030

On the Road, Online

■ Total U.S. sales ■ Connected car sales

20.0 million vehicles

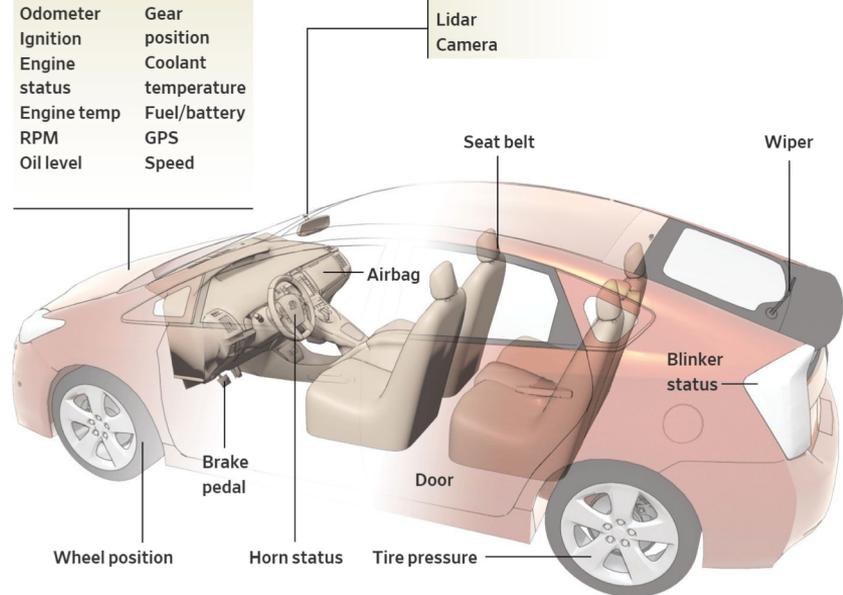|	2012	2016	2020*	2024*

*Estimates
Source: IHS Markit

Drawing Out Data

Auto makers have the ability to collect data from various points on the car, pulling information generated by the vehicle's on-board sensors and computers

Potential data sources

Odometer	Gear position
Ignition	
Engine status	Coolant temperature
Engine temp	Fuel/battery
RPM	GPS
Oil level	Speed

Lidar
Camera

Seat belt

Wiper

Airbag

Blinker status

Brake pedal

Door

Wheel position

Horn status

Tire pressure

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Leading digital companies generate better gross margins, better earnings and better net income than organizations in the bottom quarter of digital adopters.
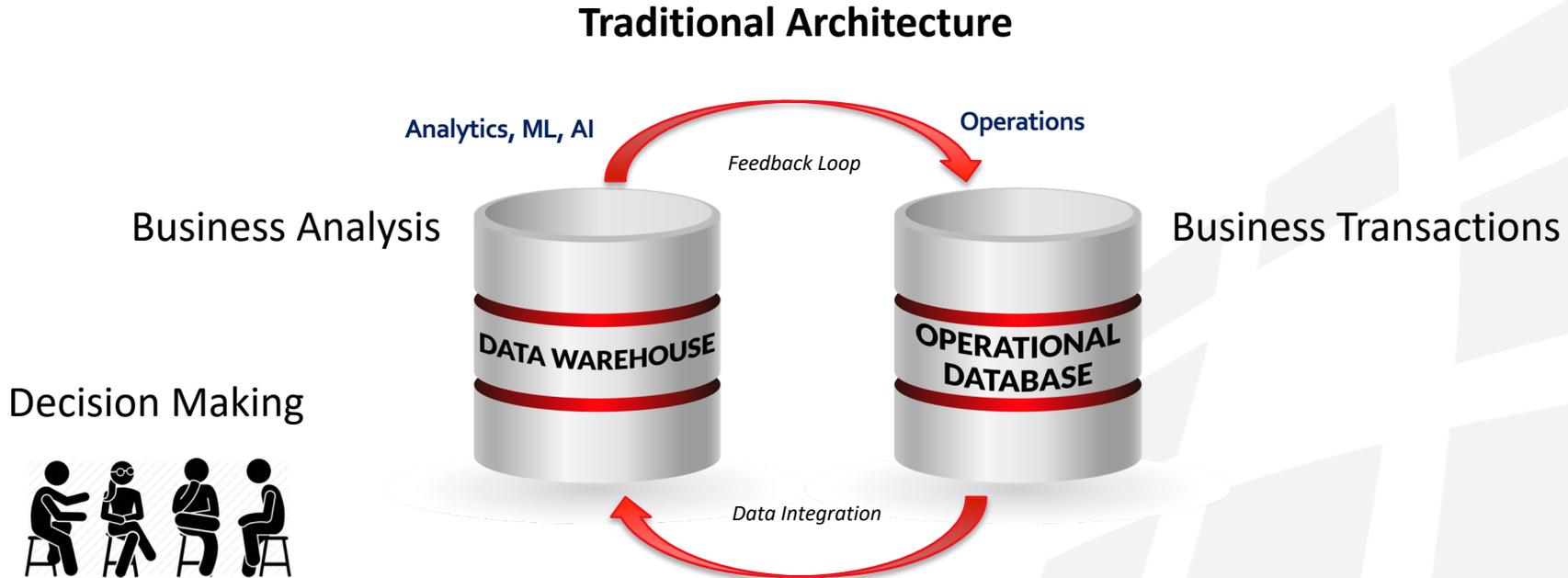
Performance Metric	Digital Laggards (Bottom 25% of enterprises)	Digital Leaders (Top 25% of enterprises)
Three Year Average Gross Margin	37%	55%
Three Year Average Earnings before Taxes	11%	16%
Three Year Average Net Income	7%	11%

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Everything in Our Lives will be Embedded with Electronics, Sensors, Software and Connectivity

- Smart Cities
- Digital Health
- Predictive Maintenance
- Adaptive Energy Grids
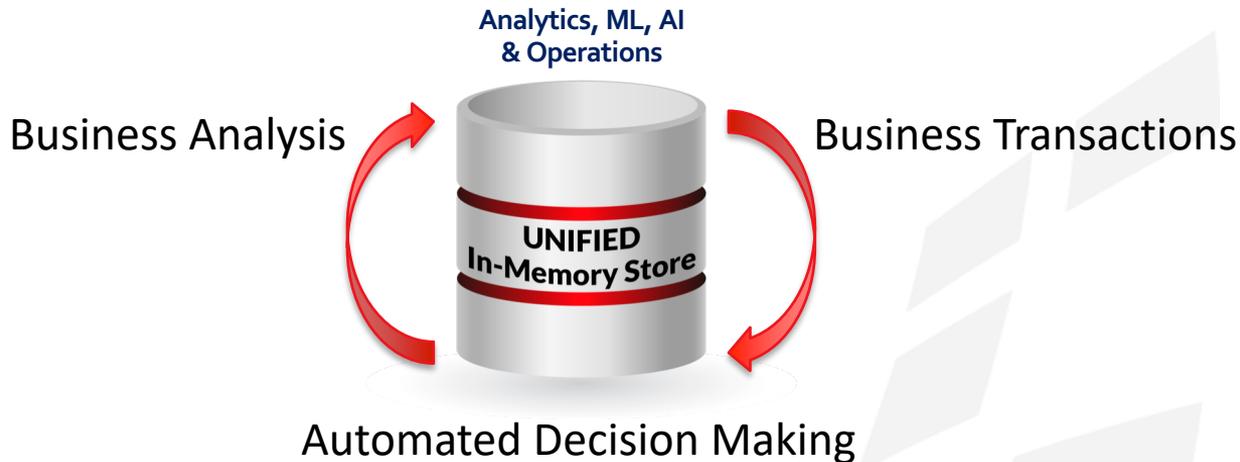- Connected Insurance
- Smart Contracts/Blockchain

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IMC Enables the Digital Enterprise

- When everything is instrumented…
  - Data is always flowing
  - Data ingestion and processing happens on a massive scale
- Instant processing and continuous learning
  - Analysis and decision-making happens in real time to…
    - Capitalize on opportunities as they present themselves
    - Gain instant market advantage

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Traditional IT Architectures Will Struggle to Meet the Needs of the Digital Enterprise

Traditional Architecture

Analytics, ML, AI

Operations

Feedback Loop

Business Analysis

Business Transactions

DATA WAREHOUSE

OPERATIONAL DATABASE

Decision Making

Data Integration

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IMC Platforms will Power the Digital Enterprise
(HTAP - Hybrid Transaction/Analytical Processing)

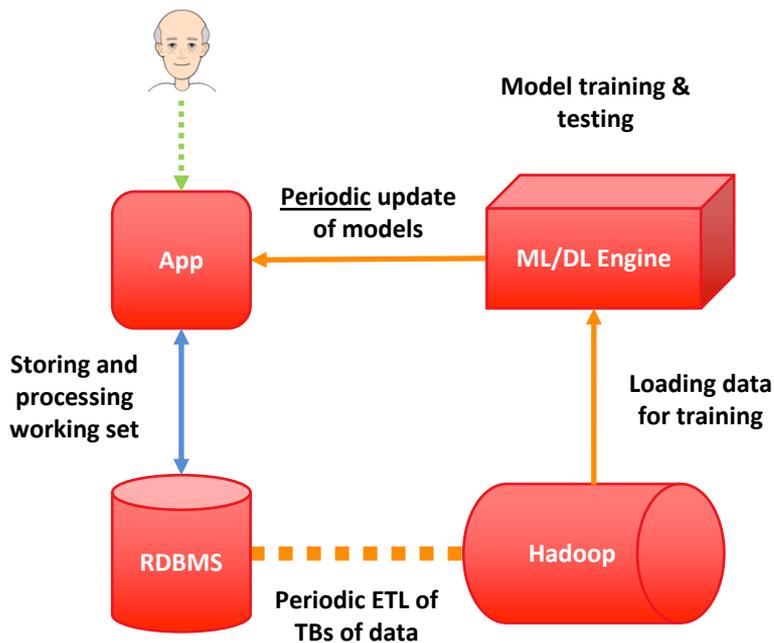*"IMC-enabled HTAP can have a transformational impact on the business." — Gartner 2/17*
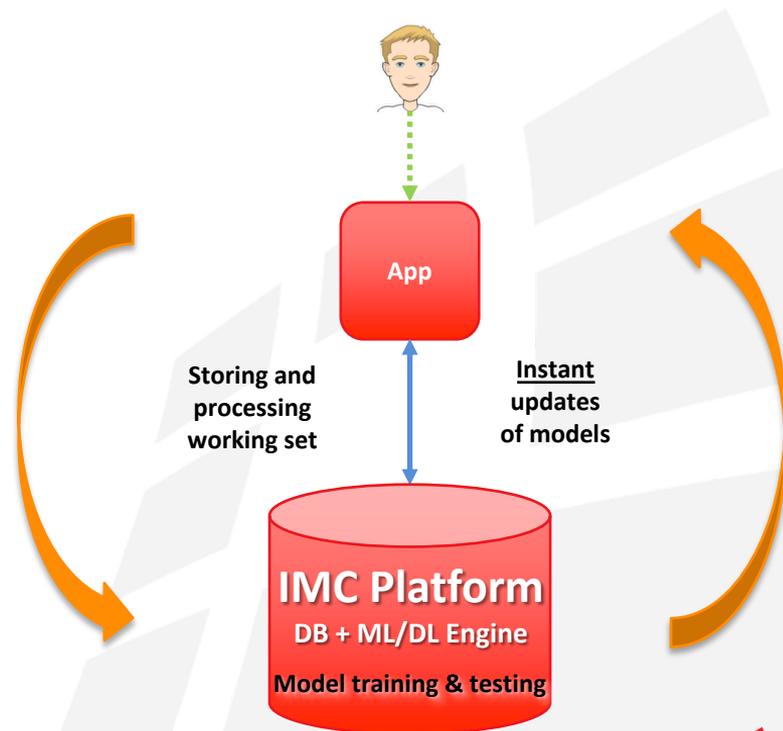
Unified IMC HTAP Architecture

Analytics, ML, AI & Operations

Business Analysis

Business Transactions

UNIFIED In-Memory Store

Automated Decision Making

IMC-enabled HTAP enables situation awareness on live transaction data as opposed to after-the-fact analysis on stale data

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IMC Platform with Continuous Learning Framework Enables Simplified ML/DL Workflow — No ETL
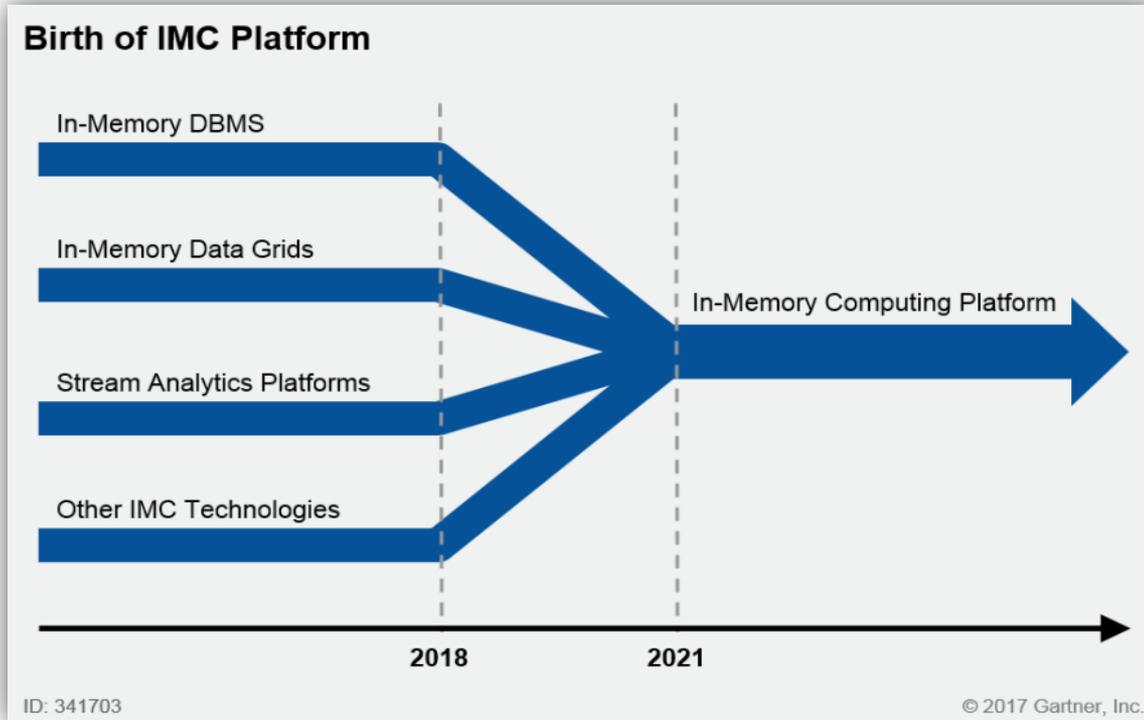

Before

After (With CLF)

Model training & testing

App

Periodic update of models

ML/DL Engine

Storing and processing working set

Loading data for training

RDBMS

Hadoop

Periodic ETL of TBs of data

App

Storing and processing working set

Instant updates of models

IMC Platform

DB + ML/DL Engine

Model training & testing

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Gartner Defines In-Memory Computing Platform

Gartner Strategic Planning Assumptions

- By 2019, **75% of cloud-native application development will utilize IMC or services that use IMC**, thus enabling mainstream developers to implement high-scale/high-performance applications

- By 2021, at least **25% of large and global organizations will adopt platforms combining multiple in-memory technologies** to reduce their IMC infrastructure complexity

- By 2022, **40% of large and global enterprises will be using IMDBMSs** to reduce the proliferation of physical data stores in the publication of data

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The Business of the Future is Digital

- Tomorrow's companies will…
  - Sense, optimize, predict and react in real time
  - Embrace new digitally-enhanced business models and revenue streams
  - Be more competitive, opportunistic & profitable
  - Scale faster and more cost effectively

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