

# **Elegance & Efficiency: Driving the Industry to a Customer Centric Manufacturing Model**

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# Outline

- An Industry in Transition
- The AMD Manufacturing Advantage
- A New Way of Thinking: Lean
- The Role of eManufacturing
- Q and A



# The Industry Continues to Evolve

- Customers expect more than ever before from chip makers:
  - Rapid technology transitions
  - World class yields
  - Flexible capacity to scale with increasing demand
  - Speed and agility for a fast time-to-market
- Meeting these needs requires new philosophies and approaches to manufacturing
  - Collaboration and customer centricity

# Customers Demand a Smarter Approach

- The **“Brute Force”** approach is running out of steam
  - More manpower and real estate does not equal better customer service
  - Overly aggressive technology and process transitions can be a liability
  - Each customer and production environment is unique: There is no “one size fits all” approach
- **“Elegant efficiency”** now drives customer value
  - Maximize existing technology before making additional investments
  - Customer needs drive technology and process transitions
  - Agility and flexibility of operations drive responsiveness – dynamically adjust production to address customers needs

# We Need to Think Differently About the Role of Manufacturing

Manufacturing must play a concrete role in increasing value for customers and improving their experience

- 1 Specify the Value
- 2 Understand the Value Stream
- 3 Create Streamlined Process Flows
- 4 Let Customers Pull Product through the Value Stream
- 5 Strive for Perfection

# AMD's Manufacturing Advantage

For over a decade, AMD has been creating a new and differentiated model focused on increasing operational speed, accuracy, agility and efficiency to maximize customer value

**Speed**

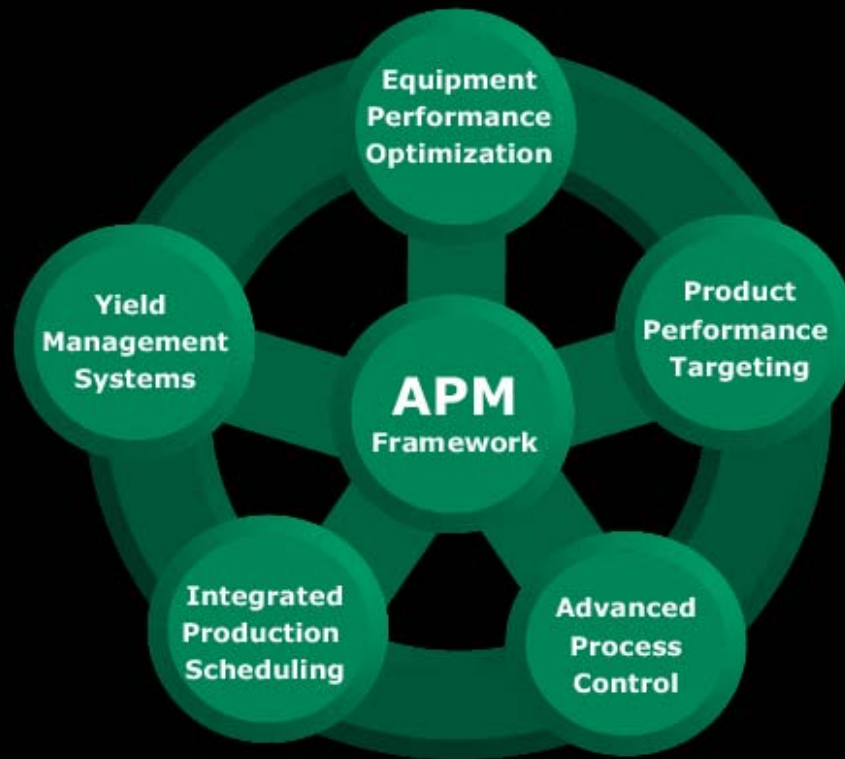
**Accuracy**

**Agility**

**Maximum Operational  
Efficiency**

**Increased Customer Value**

# APM: Unique Technology Framework Bridging Front- and Back-End Operations



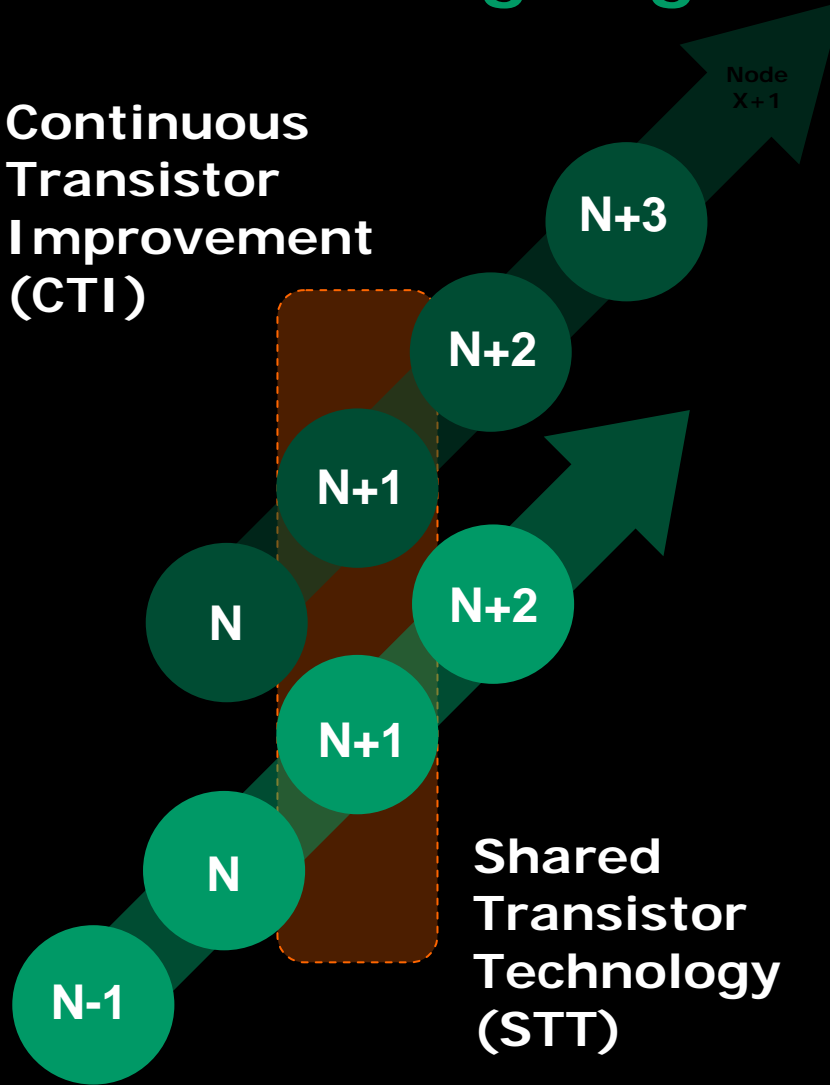
Highly automated and synchronized decision making

Five integrated algorithmic analysis systems — much more than just APC

Includes proprietary technologies, logic and business processes

# CTI and STT: A More Efficient Way to Stay on the Leading Edge

Continuous Transistor Improvement (CTI)



Continuous ongoing improvements to submicron process technologies

Enabling AMD processors to remain at the forefront of performance and power-efficiency

Helping ensure seamless and rapid transitions to next-generation technologies

# APM+CTI+STT: Maximizing Speed, Accuracy and Agility

## Speed

Fast transitions to new technology generations with achievement of mature yields

Today: 80% reduction in time to mature yield over the past three generations in Fab 30

## Accuracy

Accurate, automated adjustment for seamless introduction of latest, advanced technologies

Today: introduction of second generation strained silicon with little to no yield impact

## Agility

Agile changes to production mix and product power and performance targets

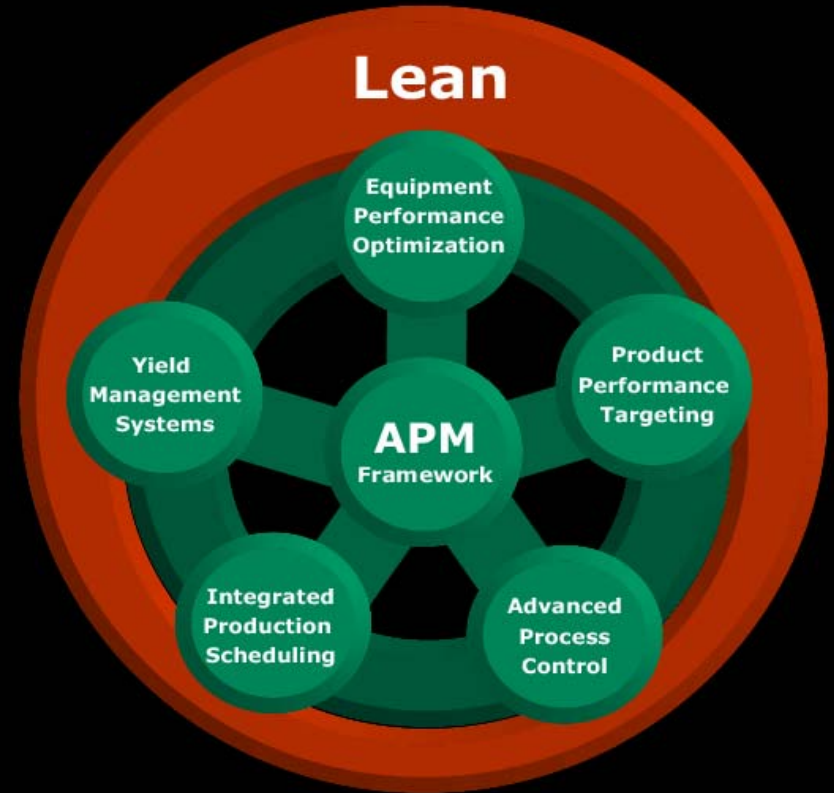
Today: Capable to go from customer signal to fab mix implementation in less than a day

## A Better Customer Experience:

OEMs can more accurately match product supply with demand to take full advantage of near-term revenue opportunities, increase average selling prices and improve margins

# Changing the Game –the Lean Approach

- Define value as perceived by the customer
- Map the value stream to identify the value and non value added steps in the process
- Use a value stream map to help eliminate all Non-Value steps



# In Other Words.....

Manufacture in the **sequence of orders**

**Only when** it is ordered

In the **quantity** ordered

At the highest possible **quality**

And with the **lowest cost** possible

# Lean Methodologies help achieve “No-Compromise” Goals, such as . . .

High-quality customer-centric products	<b>YET</b>	Lower costs and faster cycle times
Delivering highly complex products in volume	<b>YET</b>	Minimizing resources and capital investments
World-class yields & Max. ships per wafer	<b>YET</b>	Flexible manufacturing w/rapid equipment changeovers
Customer centric designs with “headroom”	<b>YET</b>	Decrease in concept-to-production timelines
Meeting & exceeding customer commitments	<b>YET</b>	Avoid building costly/stagnant Inventory
Intelligently scale capacity to meet demand	<b>YET</b>	Achieve it with far less CAPEX and people than the competition

# AMD & Lean – Progress to Date

- AMD Fab30's Lean Initiative

- Issue:

- Need to increase capacity while increasing product complexity and allowing headcount to transfer to Fab36*

- Lean Methodology:

- Productivity Increase of 31% -- Allowed significant staff transfer into Fab36*

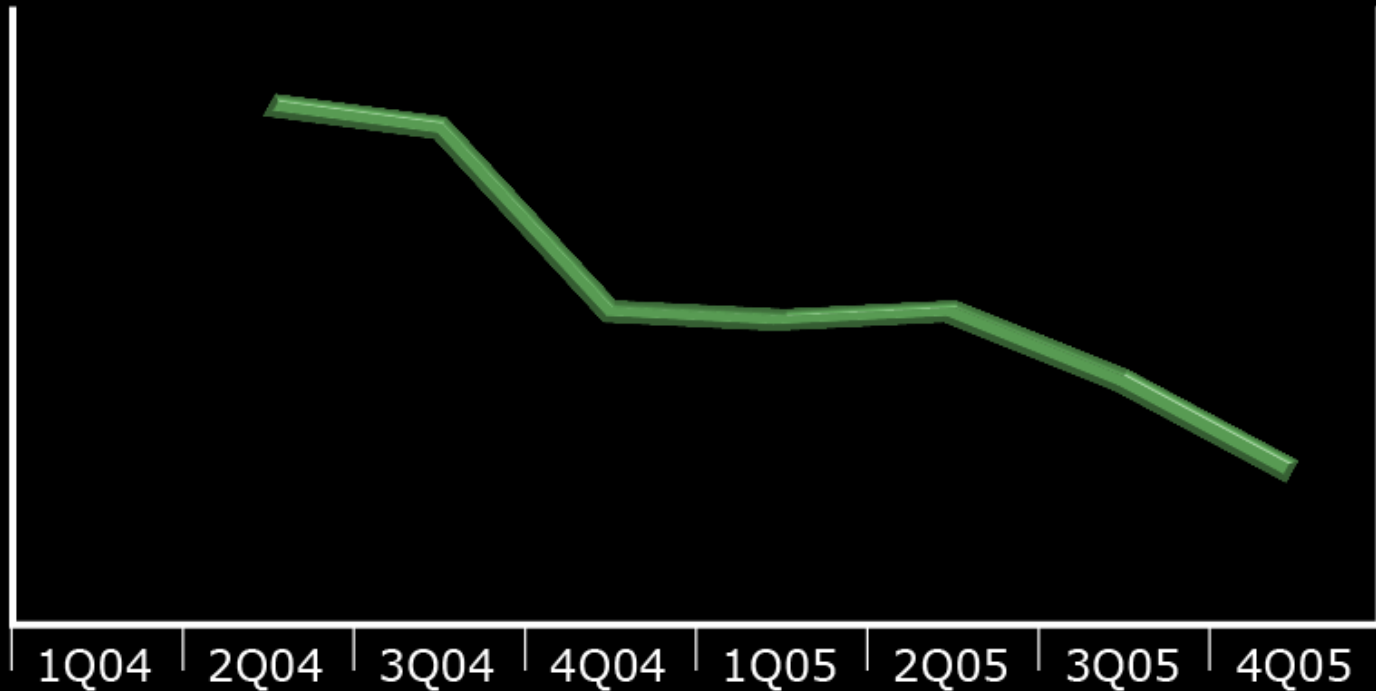
- Cycle Time Reduced by 30 days -- Overall Increase in Wafer Starts ~ 1000 per week*

# Improved Cycle Time and Productivity

## Operational Improvements

### Achieved in Fab Wafer Output and Cycle Time Concurrently

#### Fab30 - Continuous Cycle Time Improvement



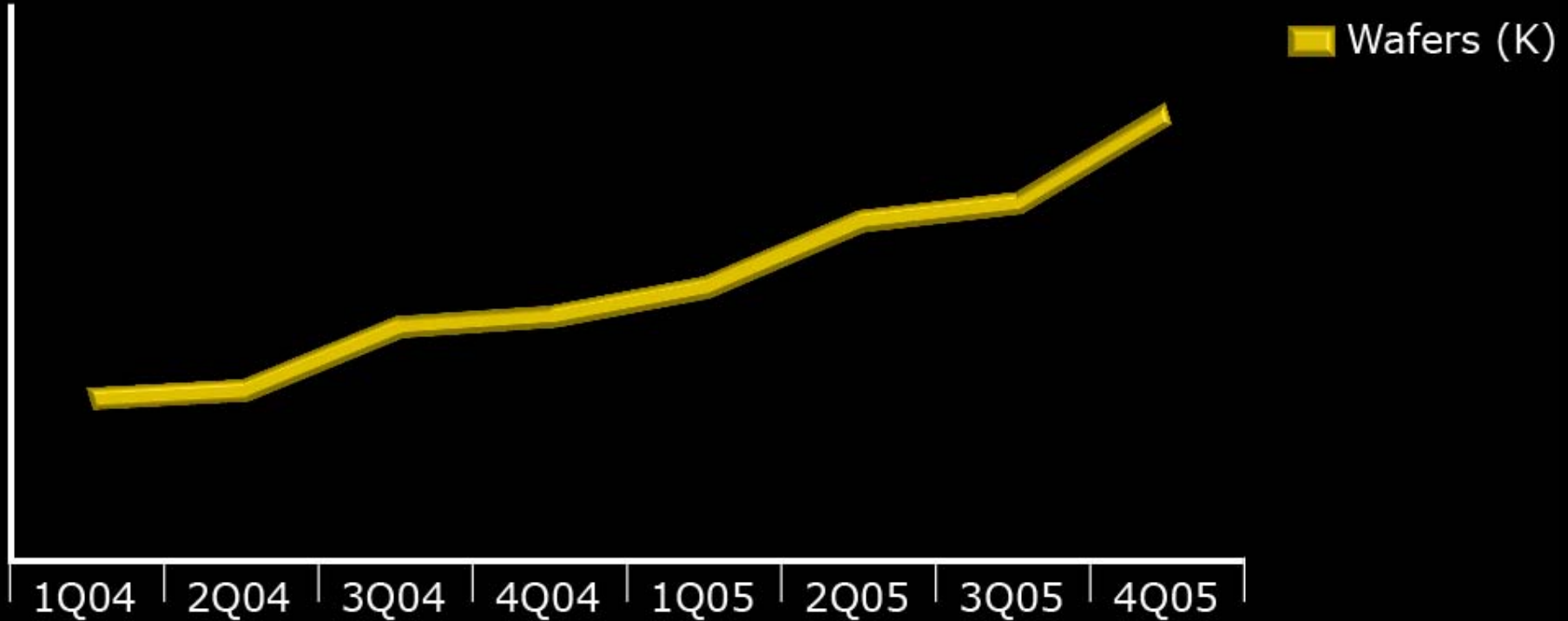
Cycle Time Improved 20%

# Improved Cycle Time and Productivity

## Operational Improvements

Achieved in Fab Wafer Output and Cycle Time Concurrently

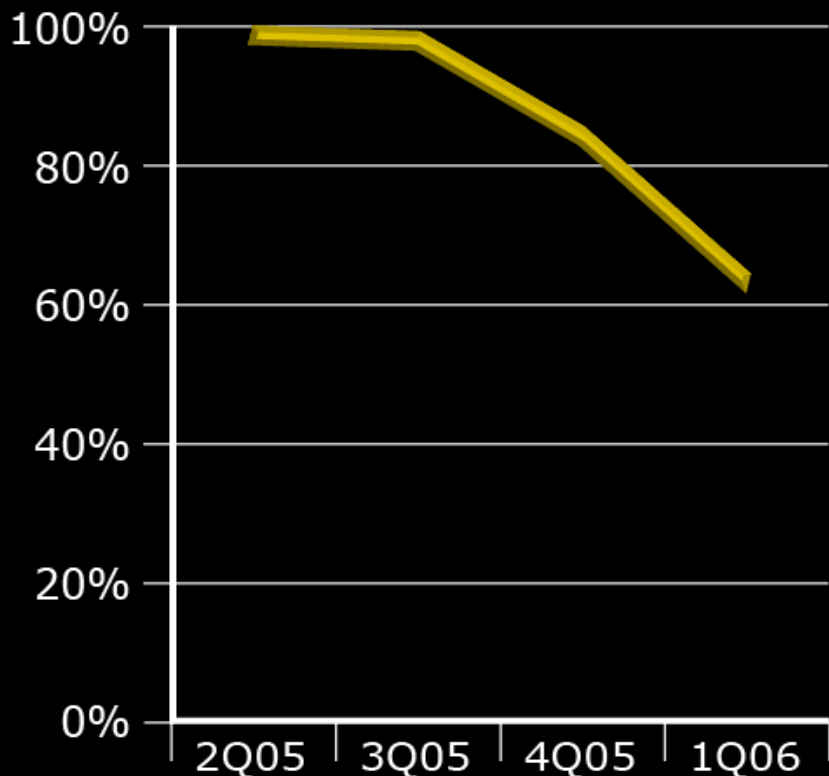
Fab30 - Continuous Productivity Improvement



Wafer Output Improved 47%

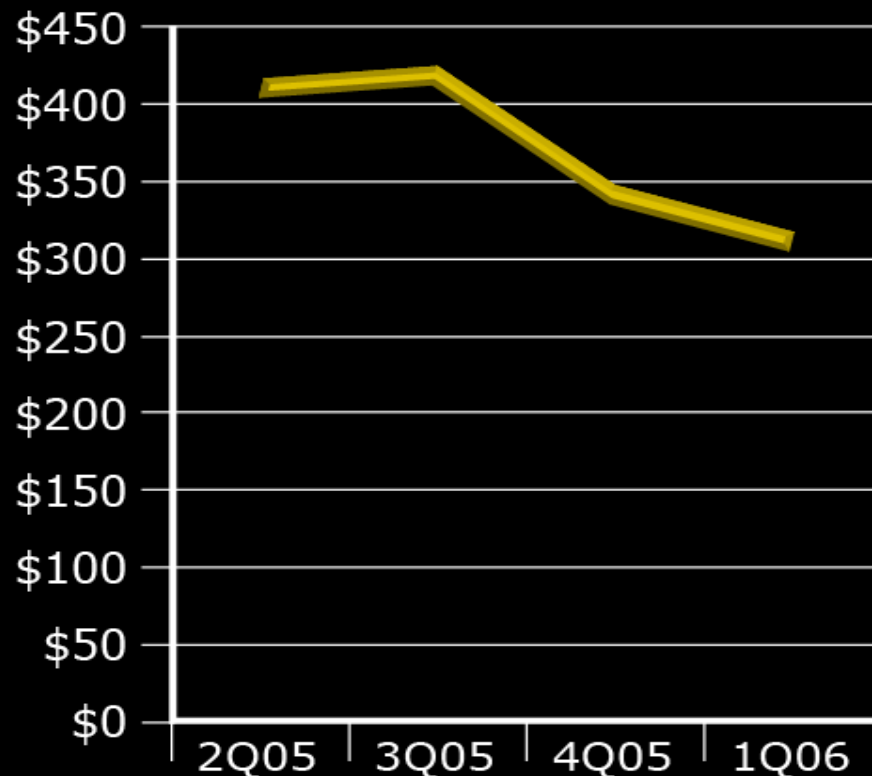
# Opportunity meets Lean Preparedness

## Total Inventory



**Total Inventory  
Improved 35%**

## MP \$ Gross Inventory



**Improvement in Sales  
\$ / Cash Flow \$238M  
Improvement in  
Operating Profit \$48M**

# eManufacturing – Creating Customer Value Through Collaboration

- Online tools offer a cost effective and quick means for to collaborate with partners
- Tool suppliers and chip makers can improve communications while protecting intellectual property
- Wafer fabrication plants can significantly increase operational efficiency by:
  - Decreasing time to qualify new tools
  - Increasing tool up time
  - Decreasing non-product wafer output
- Increased customer value
  - Increased productivity, efficiency and predictability of operations



# e-Manufacturing at AMD

- AMD collaborated with technology partners to create a secure eManufacturing framework (aka. eCentre from ILS)
  - A universal e-Diagnostics approach that can support OEMs
  - Enables secure collaborative manufacturing with dynamic, fine-grained security controls for tool access and data
  - A standards-based framework that can detect viruses, protect worker safety and provide an audit trail of actions
- Interface A Data Collection
  - Addresses the ever-increasing need for collecting more data at higher rates without compromising tool performance
  - Can apply to factory control and ad-hoc engineering analysis

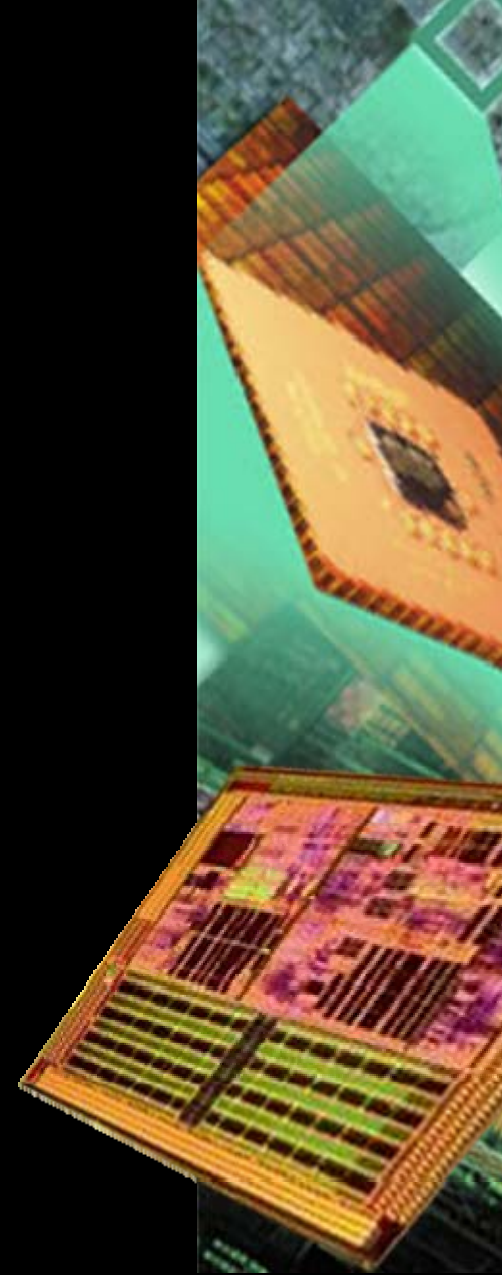


# Results To Date

- Reduced Tool Qualification Time
  - Savings may be as much as 2 months
- Reduced OEM Response Time
  - Rapid data visibility for off-site experts
- Reduced MTTR for Connected Tools
  - Has quickly reached world-class performance
- Improved Human Productivity
  - For both AMD engineers and OEM support personnel
- Improved Precision with Problem Descriptions
  - OEM experts can securely obtain the data for themselves
- Improved Time to Order New Parts/Spares
  - Remote OEM engineer can check part availability while the shift engineer is still in the fab
- Improved Data Delivery Rates with Interface A
  - 10,000+ variables/second with no tool degradation

# Tying it All Together

- Through a focus on “elegant efficiency,” AMD is driving a customer-centric manufacturing model that differentiates through:
  - Optimizing technology investments
  - Minimizing operational downtime
  - Minimizing production and development cycle times
  - Enabling secure partner collaboration
  - Providing customers with the agility to flex capacity as needed





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