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FOR IA, AI, AUTOMATION, TECHNOLOGY, AND
BUSINESS & DIGITAL TRANSFORMATION LEADERS



HUMAN ON THE LOOP VS. HUMAN IN THE LOOP: REDIFINING CONTROL IN THE AGE OF AUTONOMOUS SYSTEMS

Presented by:

Stephen Harris, *Former Chief Data Science & Growth Analytics Officer, Corporate Vice President, MICROSOFT*





Speaker Bio



Stephen Harris
*Former Chief Data Science &
Growth Analytics Officer*
MICROSOFT

Steffin is an energetic, results-driven visionary and transformational leader with nearly 30 years of technology and business experience. Ranked Top100 “Most Influential” Enterprise Data Executives globally in 2023. I help to solve some of the most complex business and technology problems facing global companies today by using data science techniques to create solutions that deliver value, ultimately simplifying the path forward.

Former Chief Data and AI Officer, for three of the five tech giants, with experience leading transformation of global teams and businesses delivering 62% uplift in cloud adoption during his tenure with Microsoft and VMware, \$1.3B revenue initiatives for Dell, and instrumental in securing \$2B board approved funding at Wells Fargo, I've been described as a "Force Multiplier". I'm passionate about initiatives focused on driving business outcomes, always eager to learn, while simultaneously bringing my wealth of knowledge developed over the 30 years of experience, education, and professional networks from institutions like Harvard Business School.

The proudest moment of my career was being recognized by NASA for my contribution in support of the STS-107 Columbia Accident Investigation as a member of the NASA Columbia Task Force.



Workshop Agenda & Talking Points

- **Topic:** Redefining Human Control in Autonomous Systems
- **Audience:** Executives leading digital transformation
- **Purpose:** Explore human roles 'in' vs. 'on' the loop, and how to enable safe, strategic, and scalable AI/automation systems

HUMAN "ON" THE LOOP VS. "IN" THE LOOP



- Control and responsibility in autonomous systems
- Managing risk and opportunities
- Examples of success and failure



Key Definitions



Human-In-the-Loop (HITL): Human directly approves/executes decisions



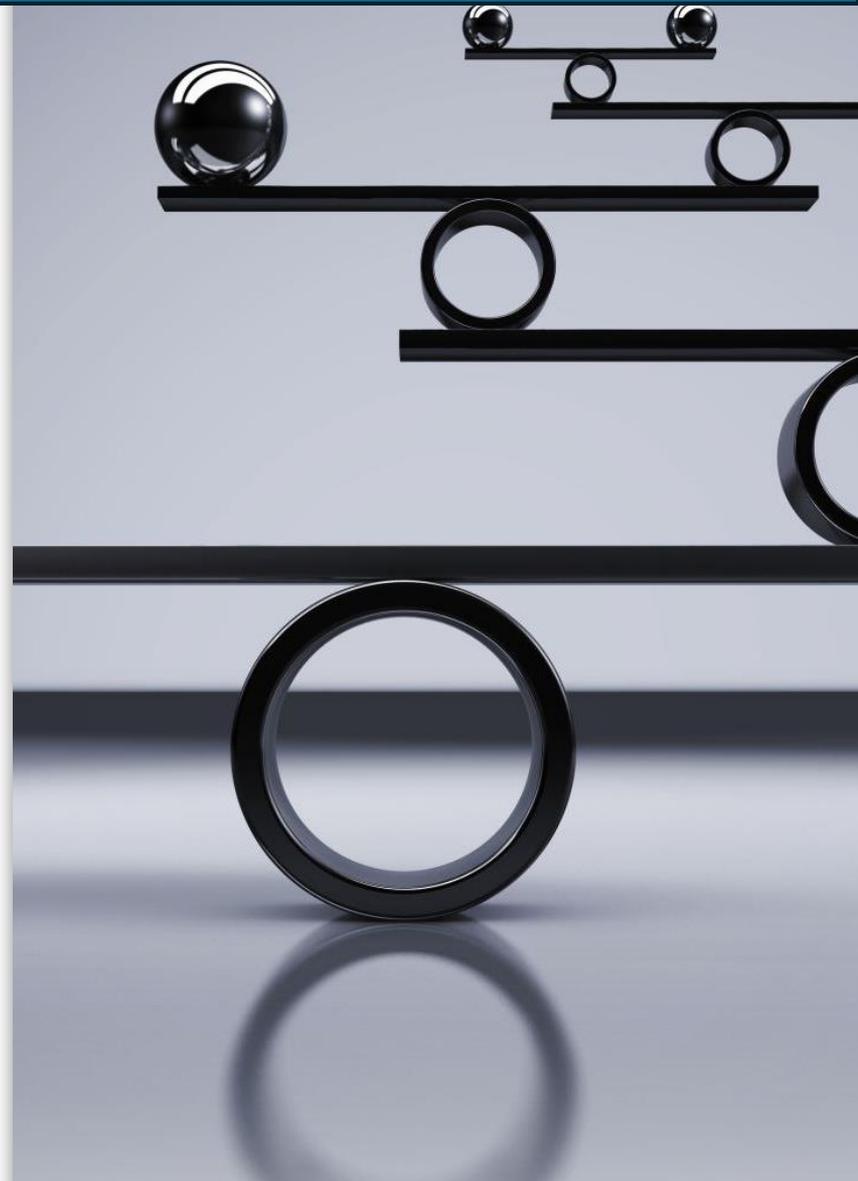
Human-On-the-Loop (HOTL): Human supervises, can intervene



Human-Out-of-the-Loop: Fully autonomous, no human involvement during operation

Strategic Importance

- Managing risk, safety, and ethics in AI
- Balancing efficiency with oversight
- Setting governance, accountability, and trust



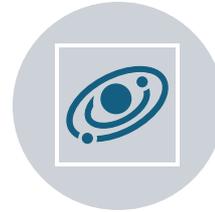
Real-World Examples



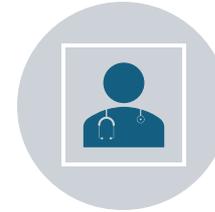
SUCCESSES:



TESLA AUTOPILOT (HOTL WITH SUPERVISION)



IRON DOME (MILITARY HOTL WITH HUMAN OVERRIDE)



HEALTHCARE DIAGNOSTICS (HITL WITH AI AUGMENTATION)



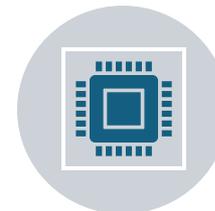
FAILURES:



UBER AV FATALITY (HOTL BREAKDOWN)



KNIGHT CAPITAL (NO CONTROL IN HFT ERROR)



IBM WATSON ONCOLOGY (UNVALIDATED HITL FAILURES)



Key Risks

Safety Gaps: Human disengagement, late intervention

Performance Tradeoffs: Speed vs. oversight

Ethical Concerns: Autonomy in life/death decisions

Accountability: Who owns errors in AI outcomes?



Strategic Recommendations

- Define decision boundaries (AI vs. human)
- Use tiered control (tactical HOTL, strategic HITL)
- Train operators + simulate edge cases
- Establish AI governance & audit reviews





Enabling Technologies



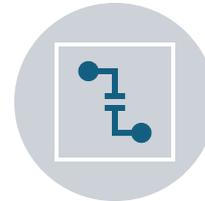
AI orchestration
platforms



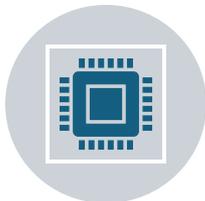
Explainable AI (XAI)



Human-machine
dashboards



Fail-safe controls &
handoff protocols



Monitoring & control
infrastructure (real-
time)



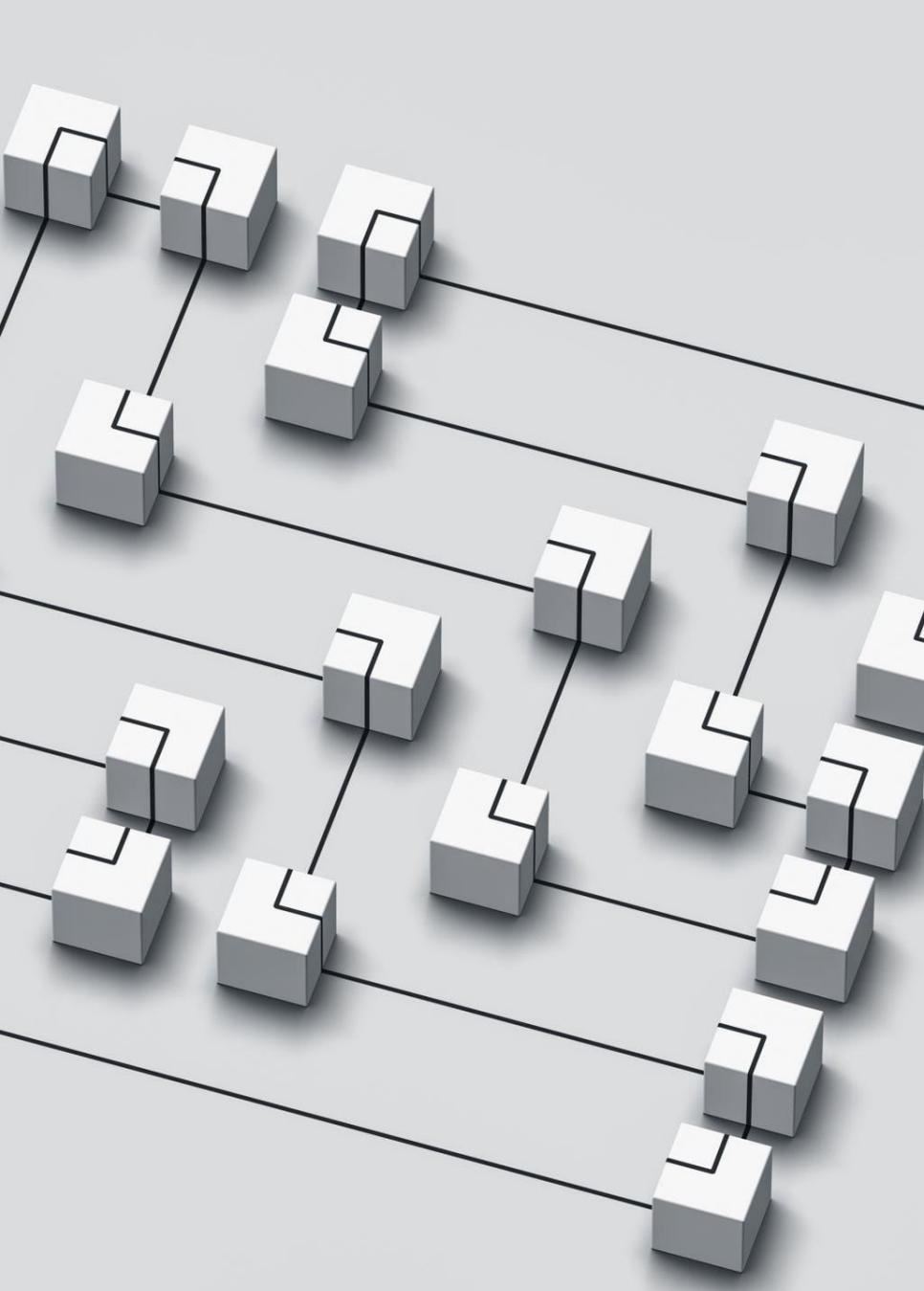
Technical Architecture

- Edge computing for fast local autonomy
- Centralized oversight for global coordination
- Data pipelines for visibility & decision traceability
- Interfaces for human interaction (dashboards, AR)
- Microsoft Cloud for Sovereignty and MCP Integration
- MCP enables HITL/HOTL with policy enforcement and AI safety
- Integration with Azure AI Studio and Fabric announced at Build



Metrics for Success

- Frequency & impact of human intervention
- Human-AI combined accuracy rates
- Operator engagement & trust levels
- Near-miss reports & audit outcomes
- Others?



The Continuum of Control

- Not binary: Tune the dial per task, risk & outcome
- Adapt models as tech matures
- Goal: Human-machine collaboration at scale

Conclusion

- Autonomy is not about removing humans, it's about redefining control
- Human 'in' or 'on' the loop = smarter, safer AI
- Use AI where it excels, keep humans where it matters most





Call to Action



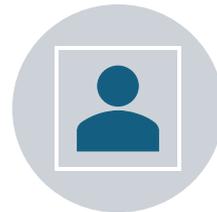
Audit your organization's current AI-human control model



Identify high-risk or high-ethics use cases needing HITL



Invest in orchestration, training, and oversight layers



Drive transformation with responsible autonomy