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AI Regulatory Challenges

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All previous technologies were at best
decision support tools

***AI can
take increasingly complex decisions***

It is essential to align the regulation with key characteristics of the underlying technology (AI).

Big Data vs Machine Learning vs AI



Learning is at the Core of Intelligence

Experience + Learning → (Human) Intelligence

Experience for Humans = (Big) Data for Machines

(Big) Data + Machine Learning → Artificial Intelligence

5 Key AI Challenges for Policy Makers

Challenge 1: “Buying AI” vs “Hiring AI”

Challenge 2: “Values Built in AI” vs “Values Built in Data”

Challenge 3: Managing AI Trade-offs

Challenge 4: Managing Uneven AI Innovation and Adoption

Challenge 5: Playing Catch-up with Rapid Technological Innovation

Challenge 1

“Buying AI” vs “Hiring AI”

Challenge 1: “Buying AI” vs “Hiring AI”



Challenge 1: “Buying AI” vs “Hiring AI”



Science 06 Dec 2019:

Algorithms on regulatory lockdown in medicine

Regulation should prioritize continuous risk monitoring

By Boris Babic¹, Sara Gerke², Theodoros Evgeniou¹, I. Glenn Cohen³

■ s use of artificial intelligence and ma-

much the way a medical resident learns on the job. But this poses a difficult regulatory design challenge. Consider two polar approaches to the update problem:

Challenge 2

“Values Built in AI” vs “Values Built in Data”

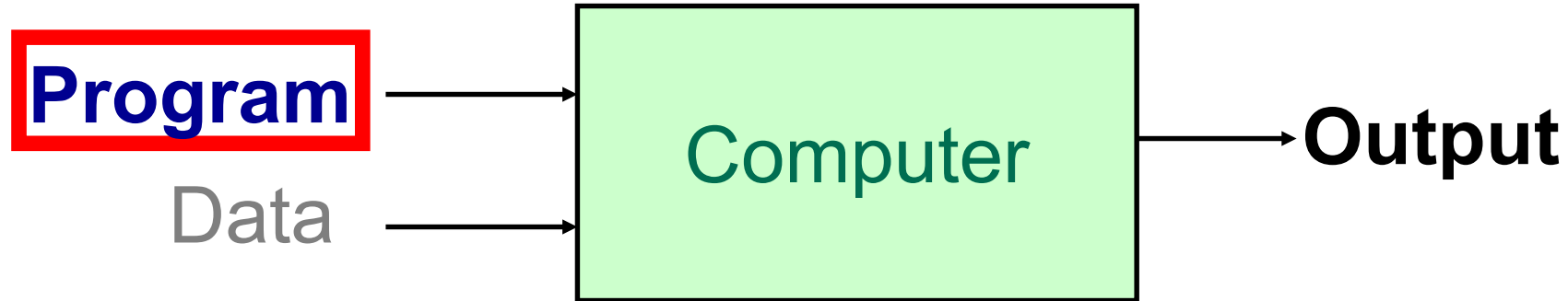
Challenge 2: “Values Built in AI” vs “Values Built in Data”



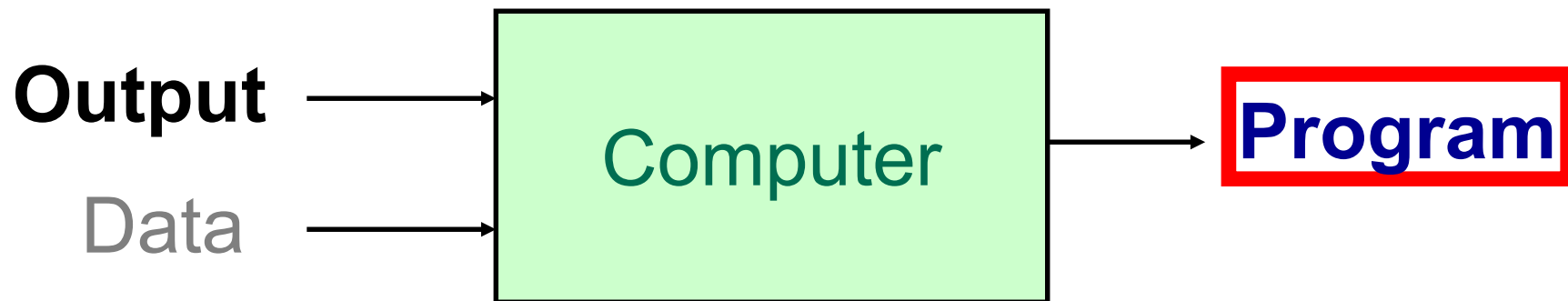
Emphasis on **“AI based on European values”** and call for EU to **“export its values across the world.”**

European Commission White Paper on AI,
February 19, 2020

Traditional Tech: People Write the Rules/Programs



AI Tech: Machines Write the Rules/Programs



Challenge 2: “Values Built in AI” vs “Values Built in Data”



AI is the Mirror of Data,
Data is the Mirror of the Culture



Challenge 3

Managing AI Trade-offs

Challenge 3: Managing AI Trade-offs

Balancing:

- AI Performance
- Explainability (What?)
- Fairness (many versions)
- Privacy
- Security
- IP
- Incentives
- ...

**“The Price of
Values”?**

Explainable AI?



The “AI Polanyi’s Paradox”?

Machines, like humans, know more than they can tell

Challenge 4

Managing Uneven AI Innovation and Adoption



Challenge 4: Managing Uneven AI Innovation and Adoption

AI Sticky Factors:

- Data
- Skills
- Culture
- Context

New Skills for Augmenting Jobs and Enhancing Performance with AI

Dimitris Bertsimas

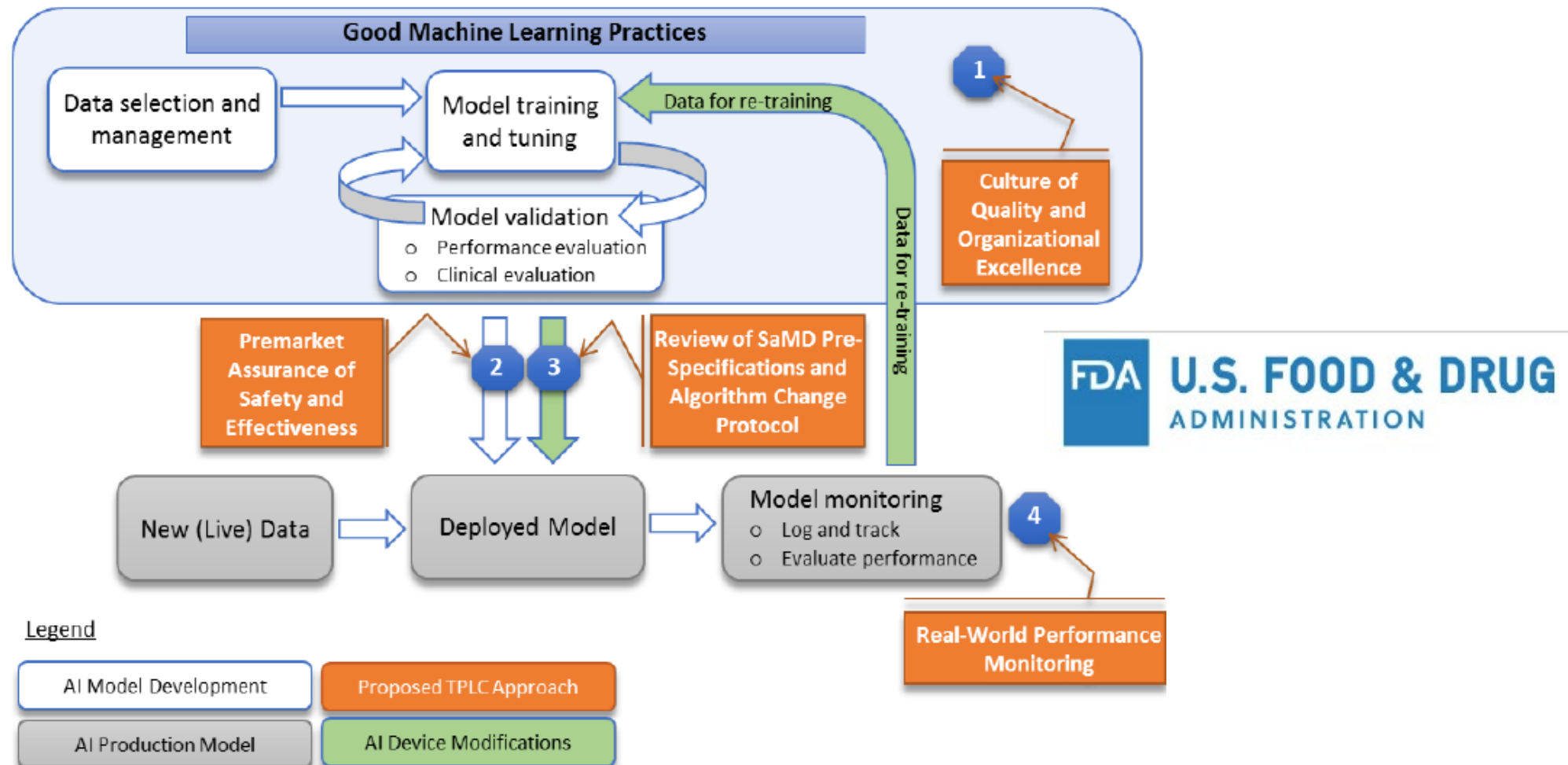
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Regulating artificial intelligence/machine learning-based software as a medical device **the need for a system view**

Sara Gerke, Boris Babic, Theodoros Evgeniou & I. Glenn Cohen*



Challenge 5

Playing Catch-up with Rapid Technological Innovation

Challenge 5: Playing Catch-up with Rapid Technological Innovation

Small Data Learning

Federated Learning

Privacy Preserving AI

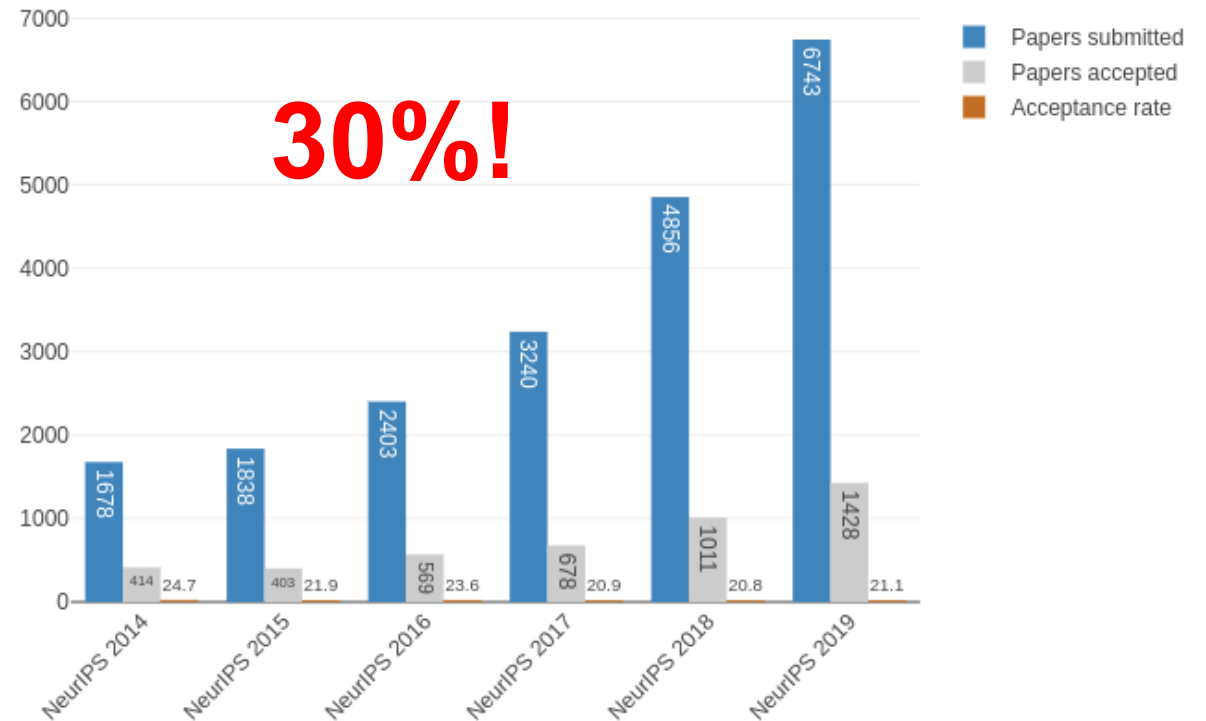
Encryption and AI

Quantum Computing

Adversarial Attacks

Multi-Task Learning

Statistics of acceptance rate NeurIPS



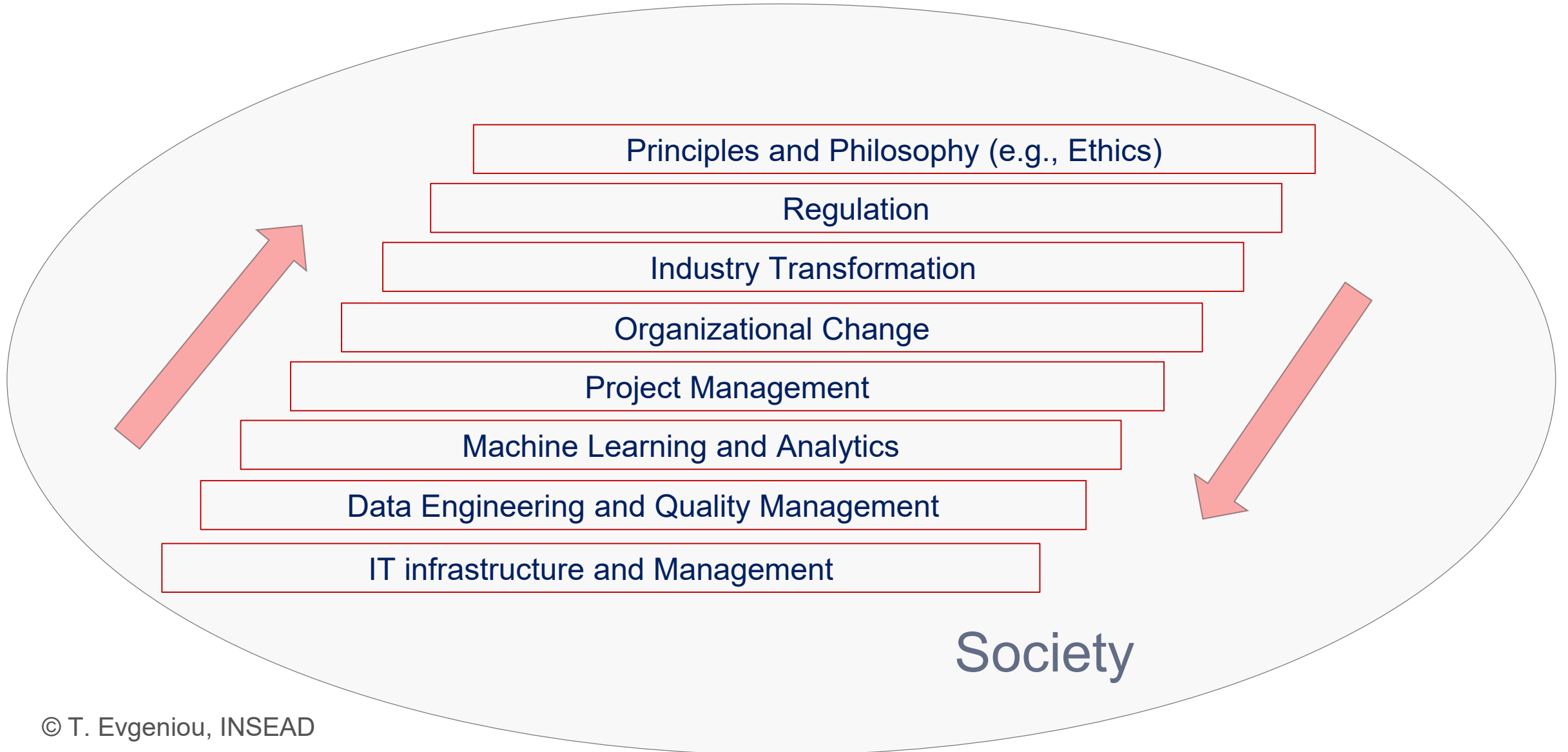
There is a Lot to Do...

...AI requires a *Holistic Approach*...

...hence a (Urgent) Need for Interdisciplinary Work...

A Final Key Message:

AI requires a Holistic Approach



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