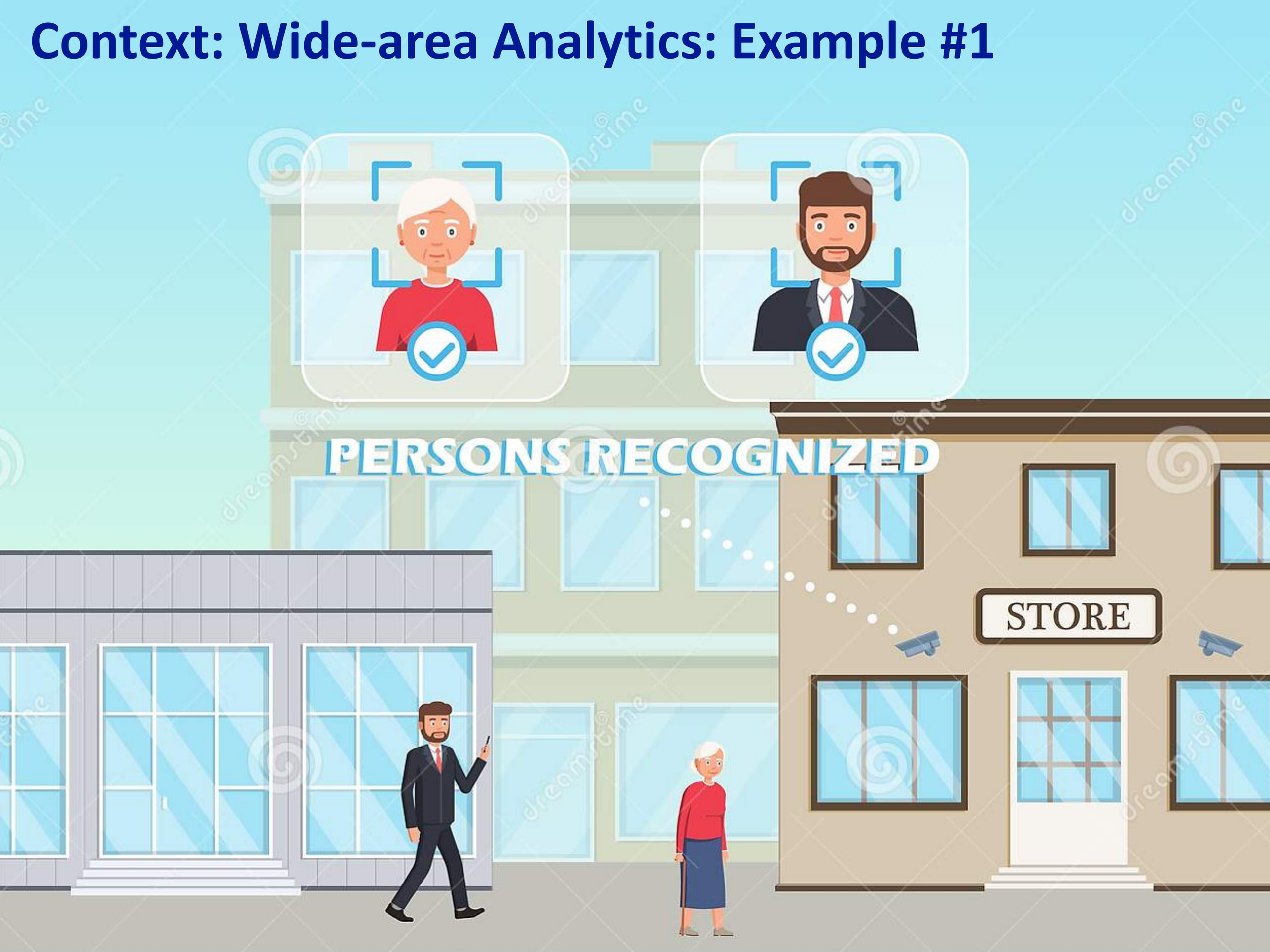
# CCC Workshop on Wide-Area Analytics

# Context: Wide-area Analytics: Example #1



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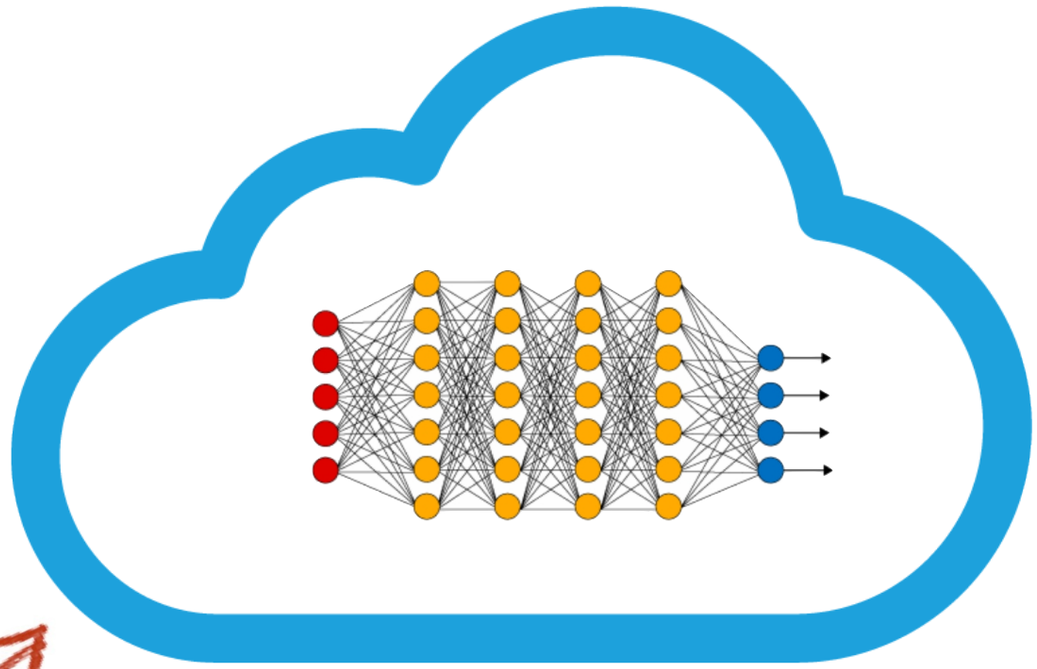


Resource provisioned

Resource constrained

**Potential (classical) questions:**

<u>Systems infrastructure related:</u>

- Storage semantics, and systems
- Compute semantics, and algorithms

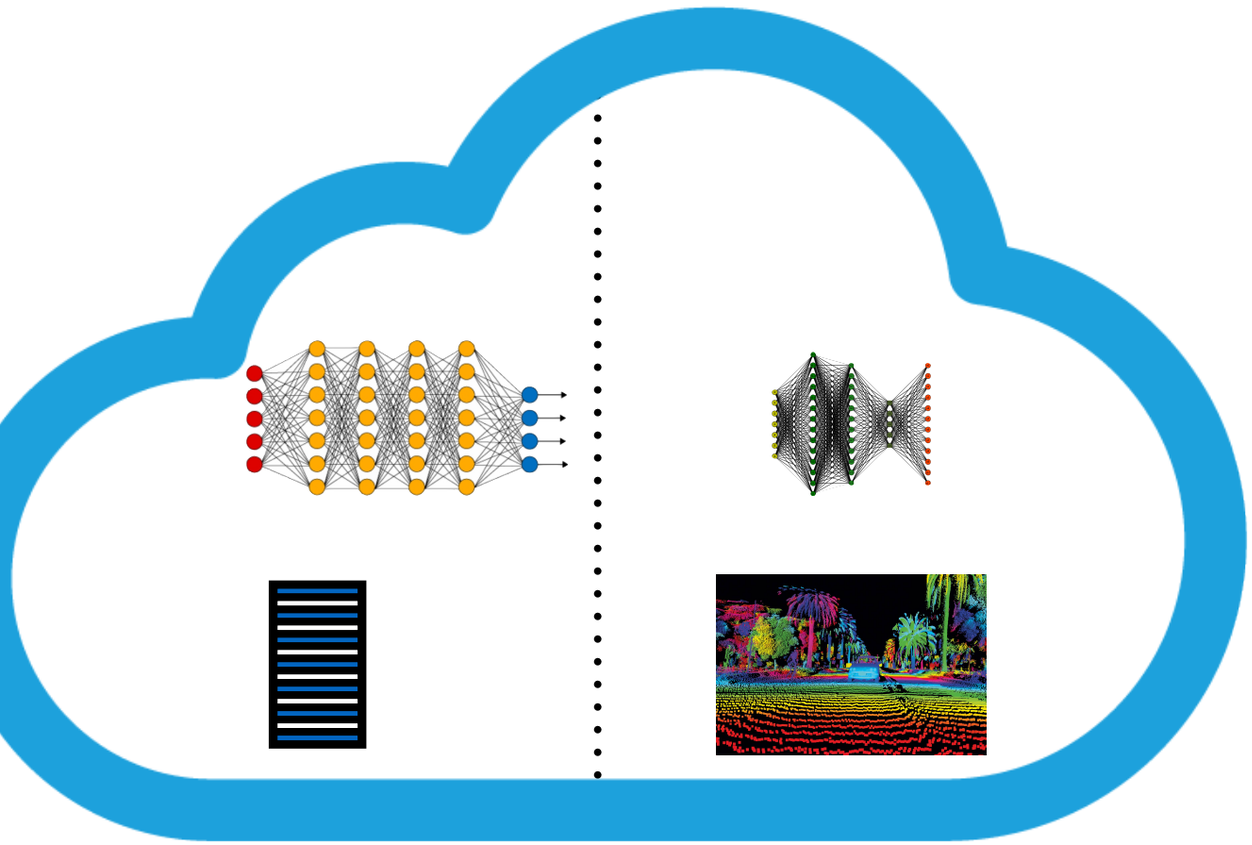
<u>Resource-performance related:</u>

- How to distribute computation?
  - Edge vs cloud?
  - Resource/Performance/accuracy?

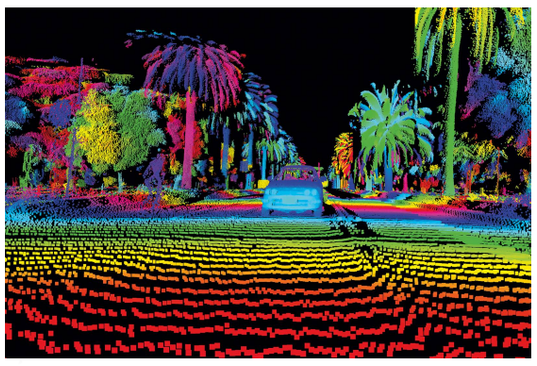
<u>Security/Privacy related:</u>

- Secure storage
- Privacy-preserving computations

# Context: Wide-area Analytics: Example #2



Potentially different goals/ constraints



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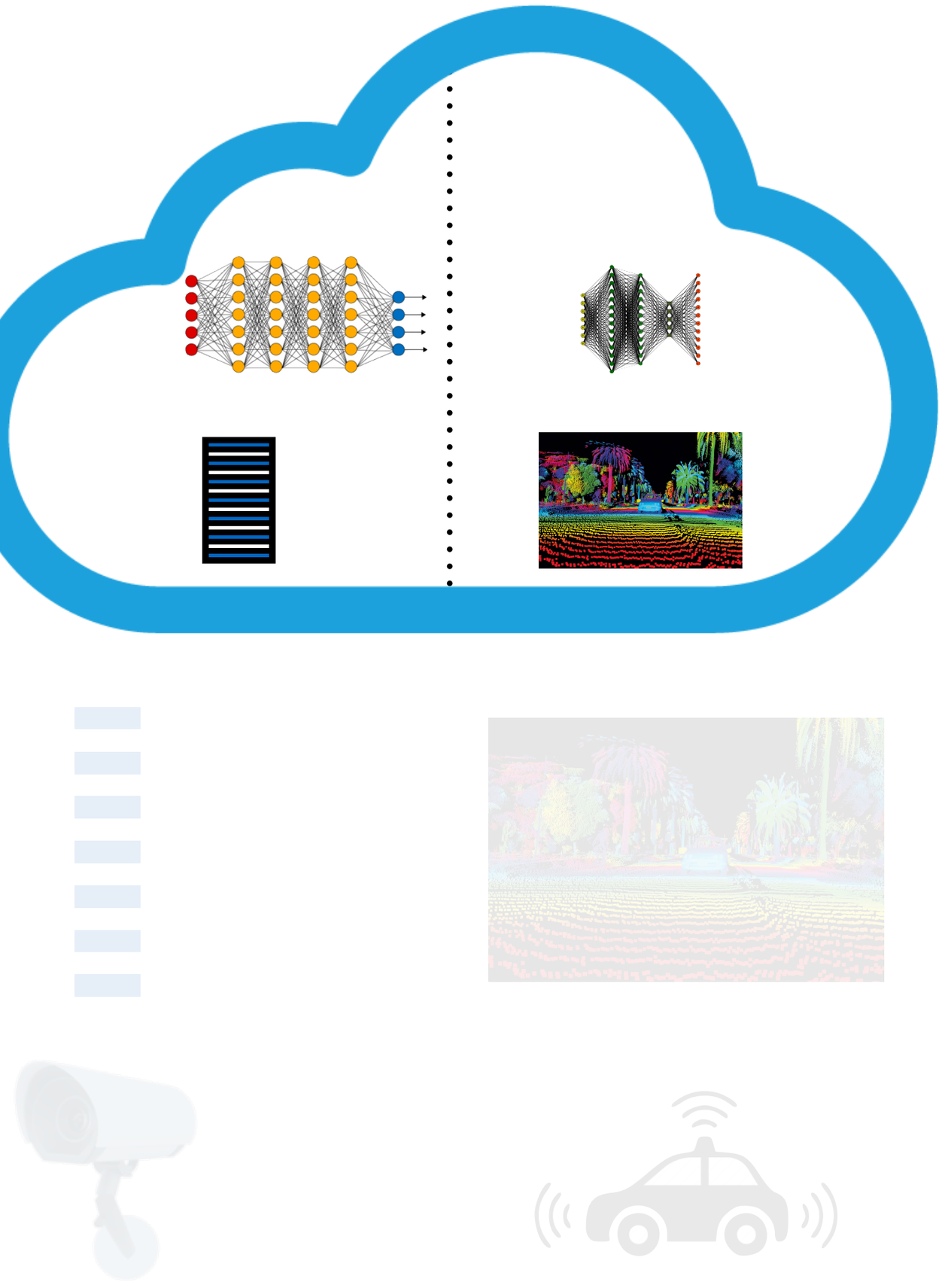







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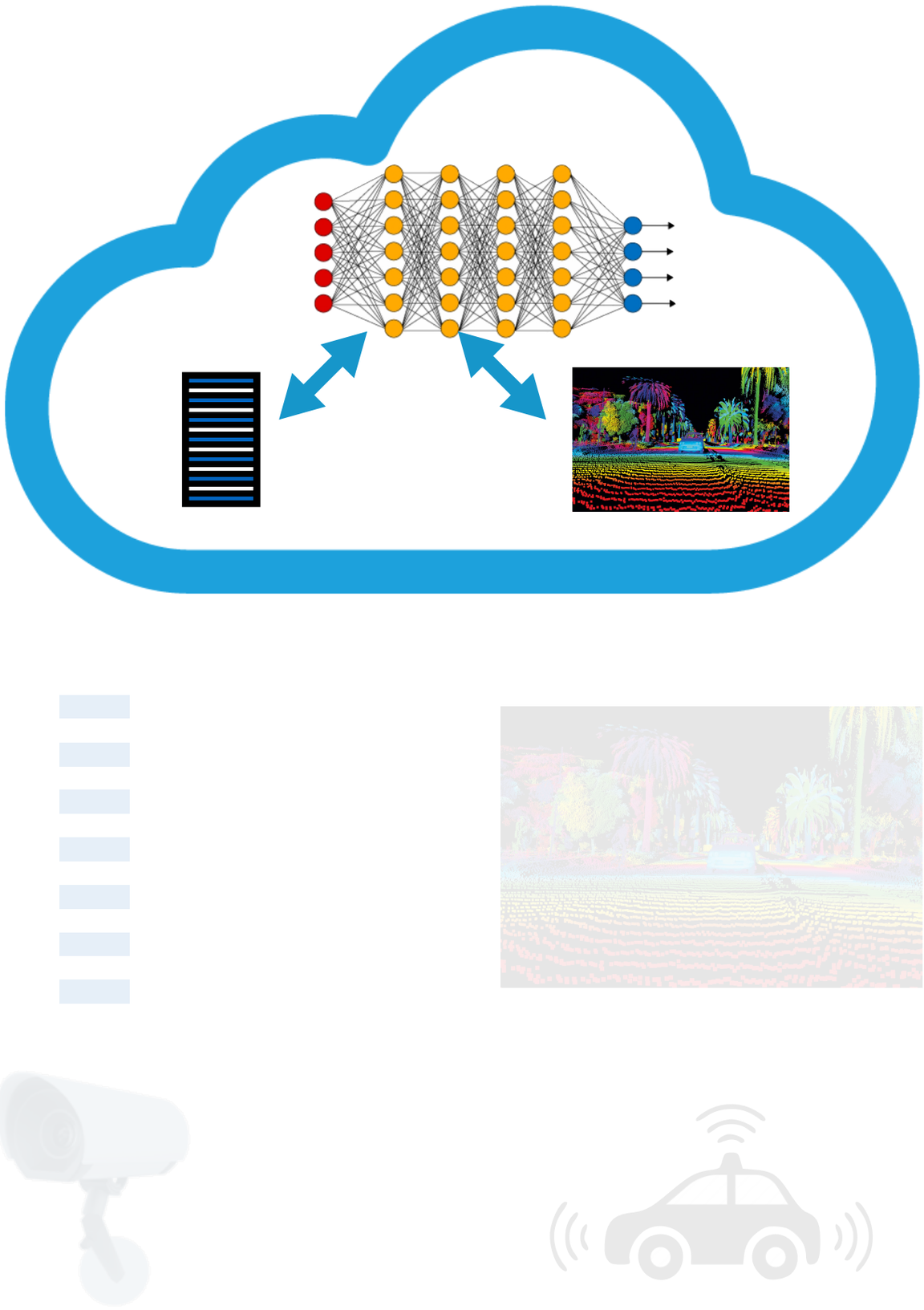







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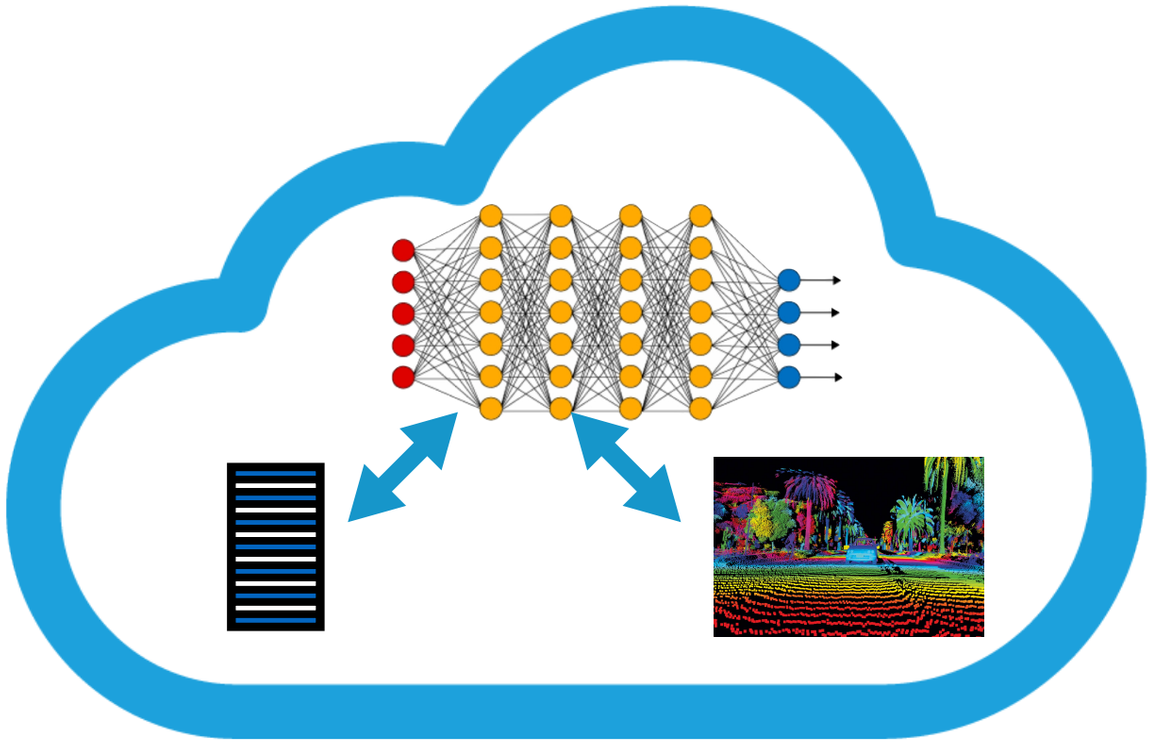

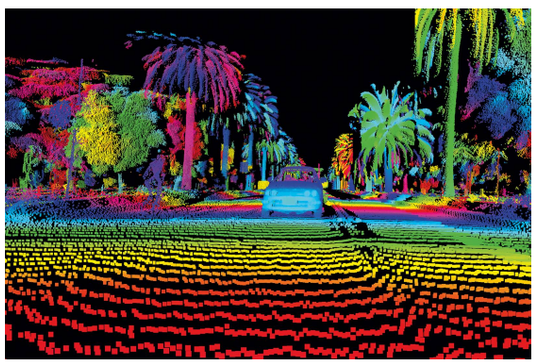

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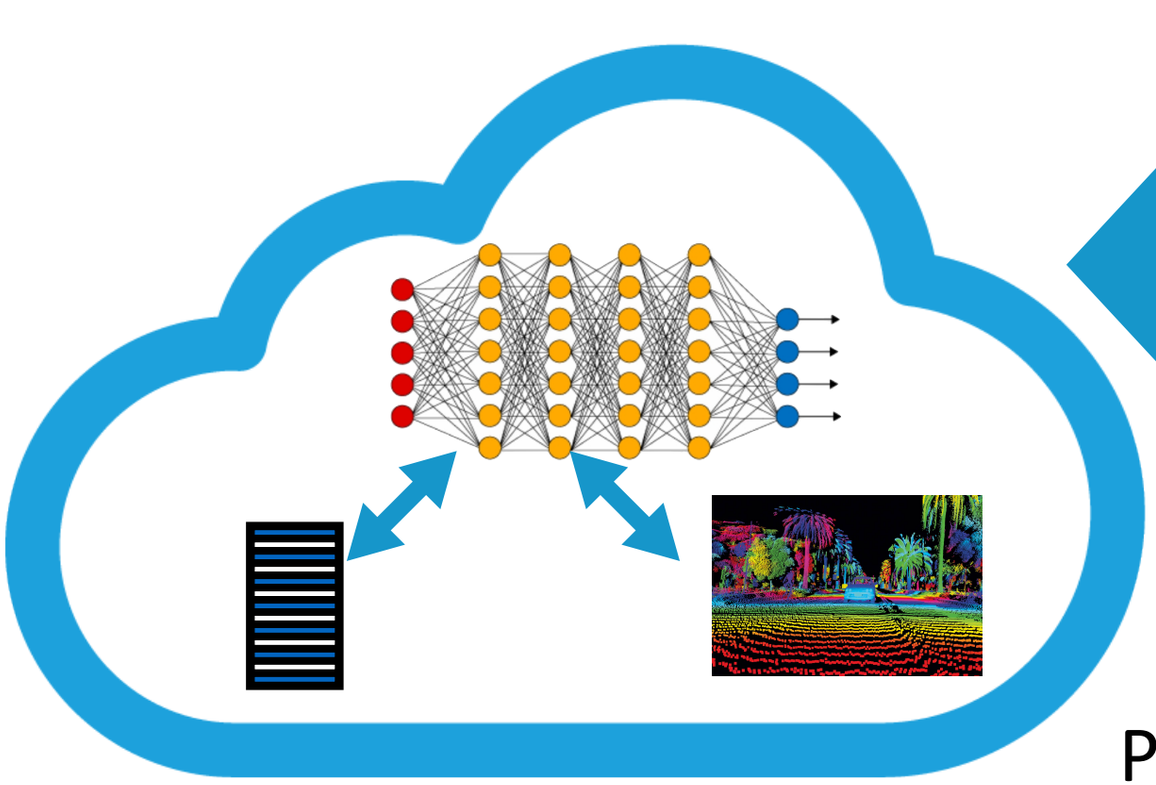

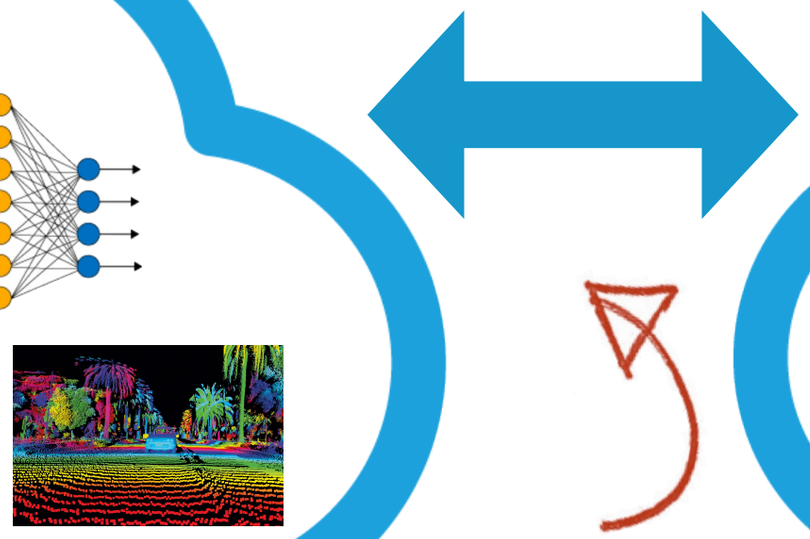

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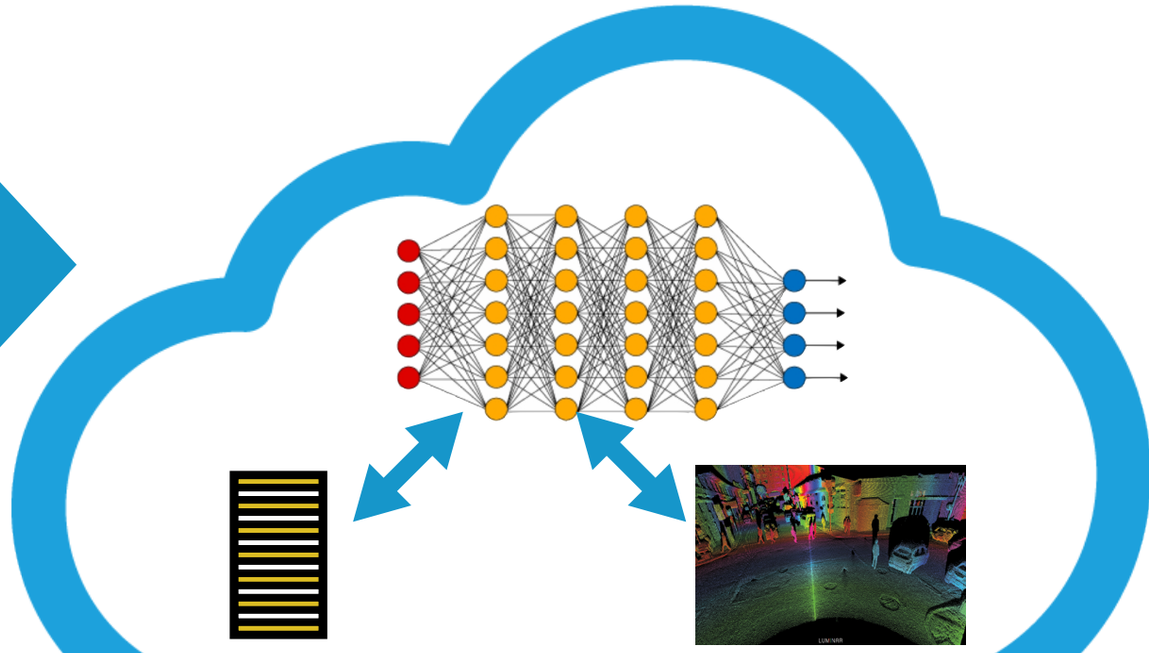
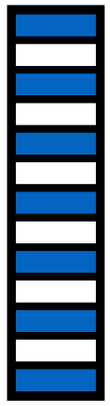
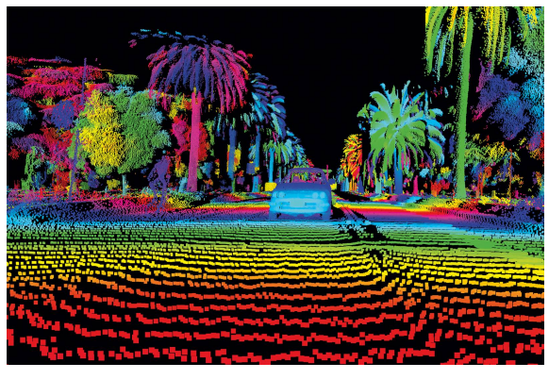
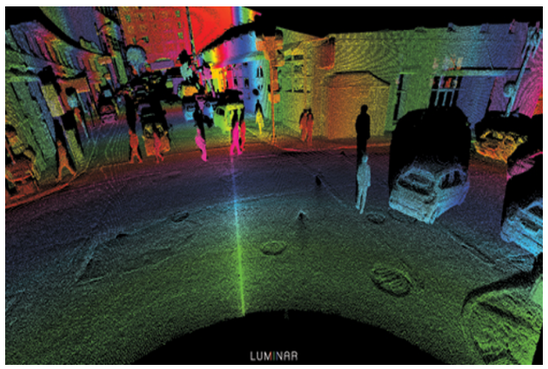




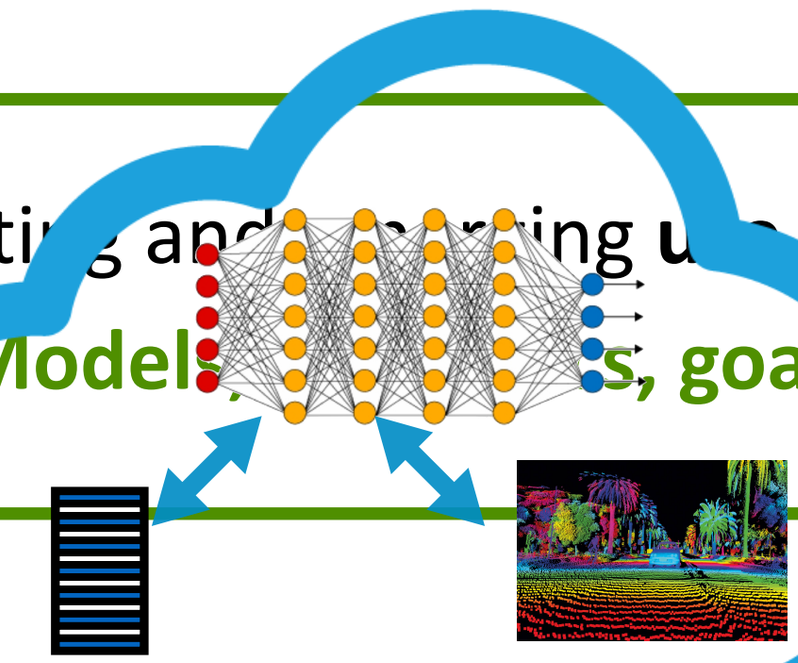


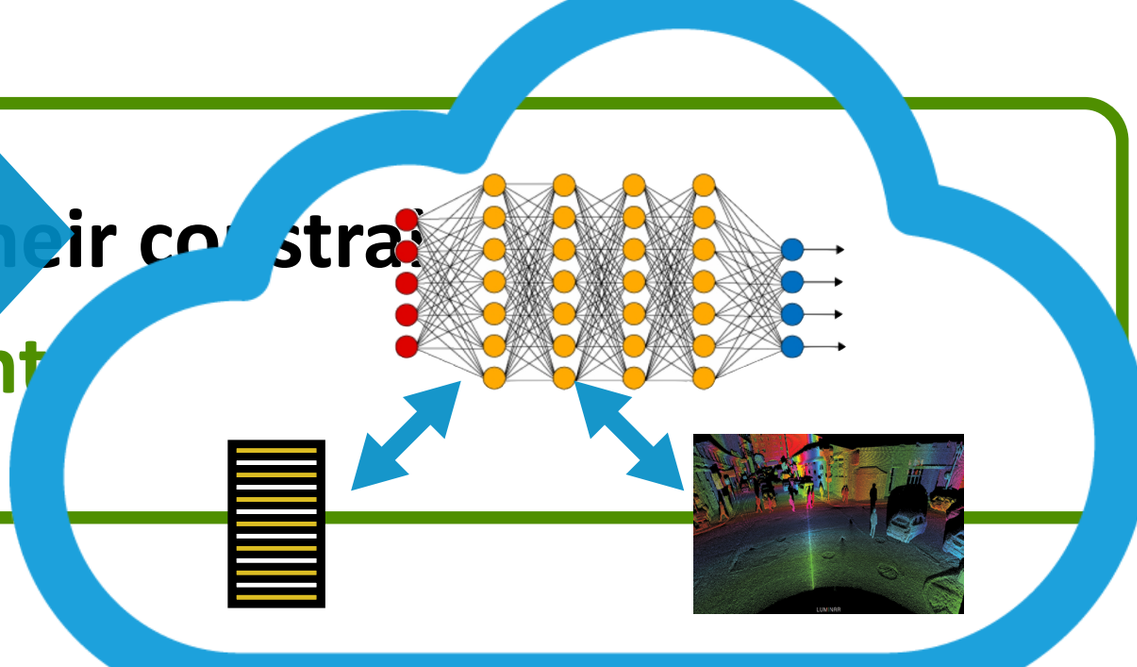


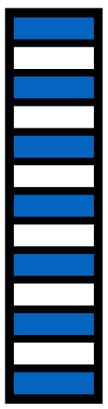
# This workshop

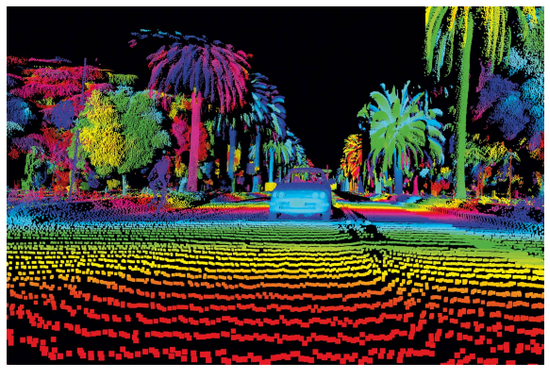
Existing and emerging **use cases** and **their constraints**

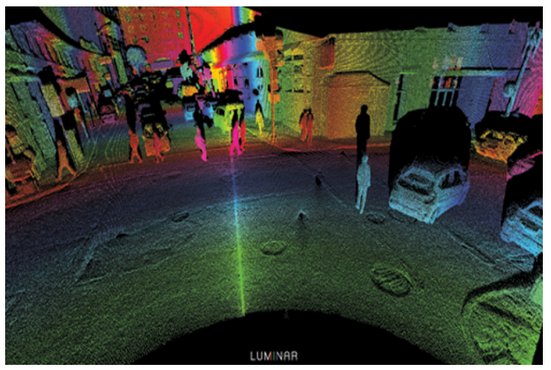
**Models, goals, constraints**











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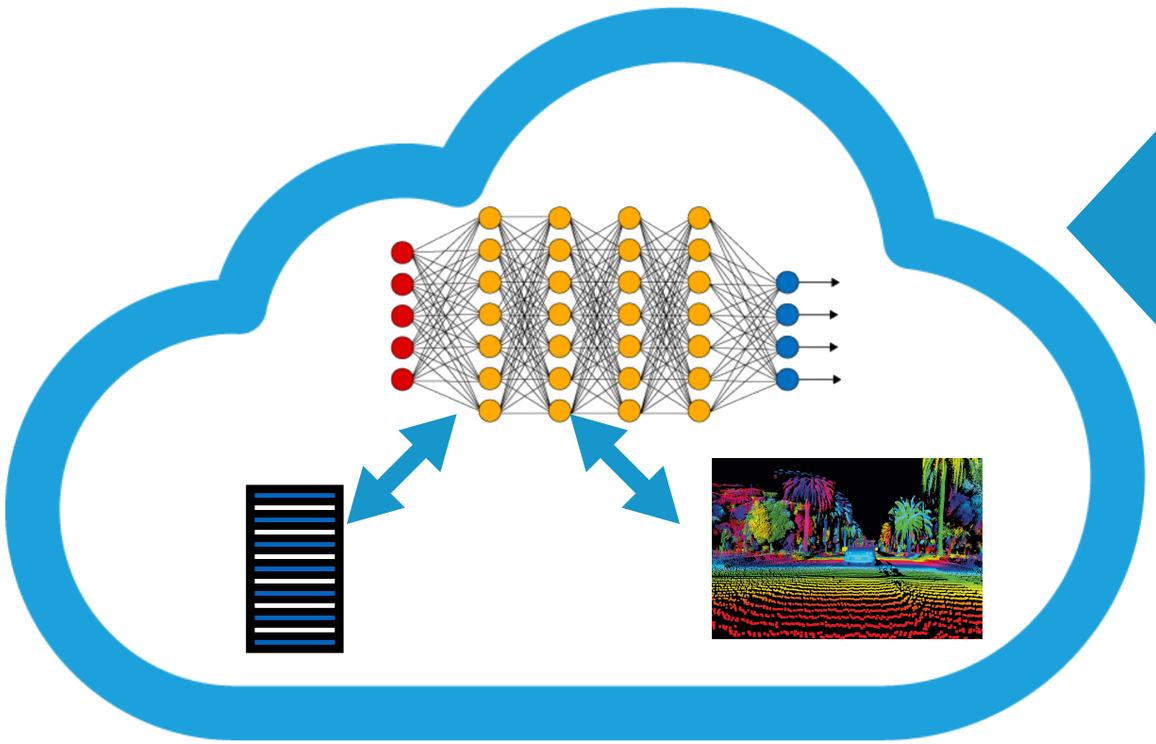
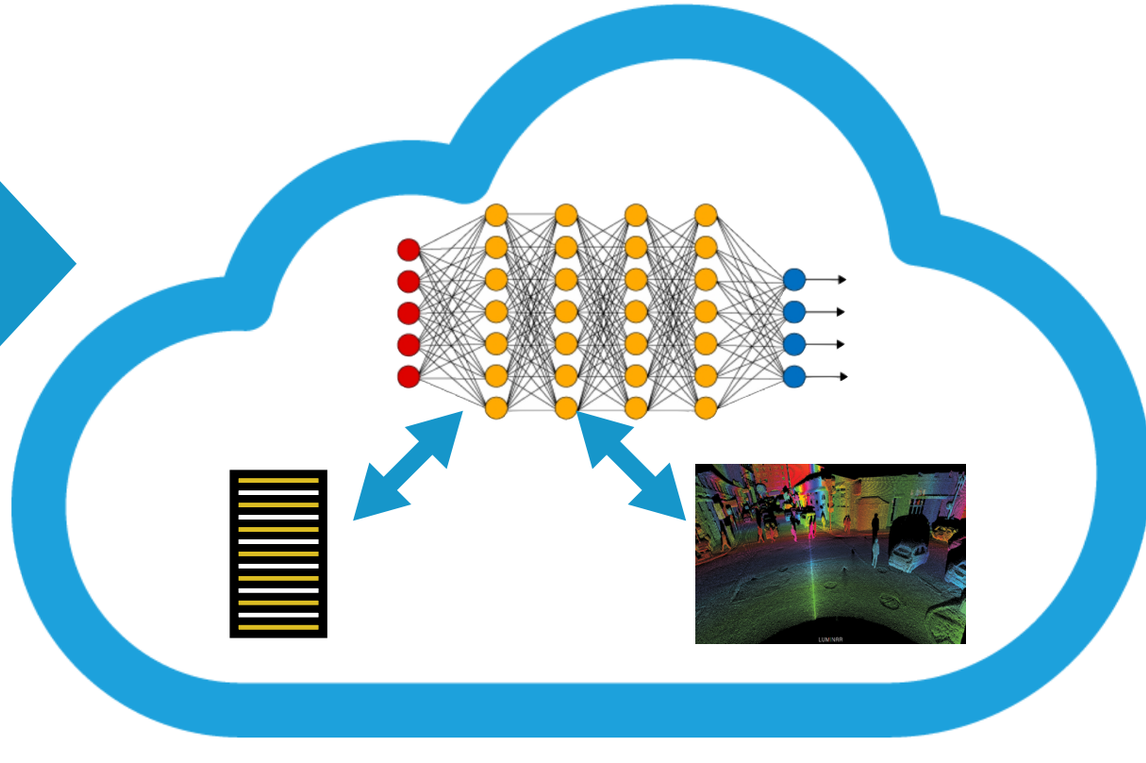
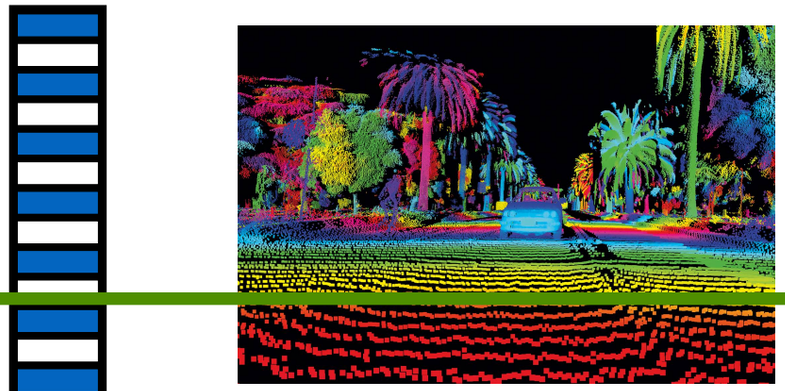
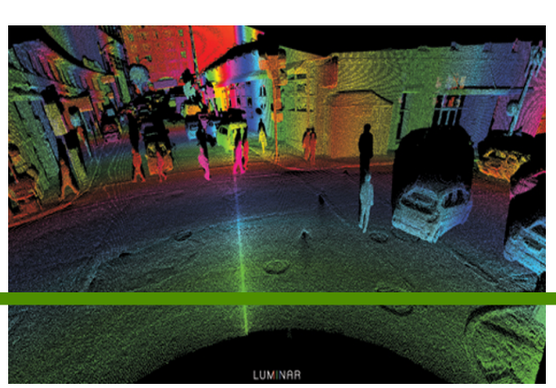








Existing and emerging **systems infrastructure** and **their properties**

**+ Models, semantics, achievable performance**

# This workshop

Existing and emerging **use cases** and **their constraints/goals**

**+ Models, semantics, goals, constraints**

Existing and emerging **systems infrastructure** and **their properties**

**+ Models, semantics, achievable performance**

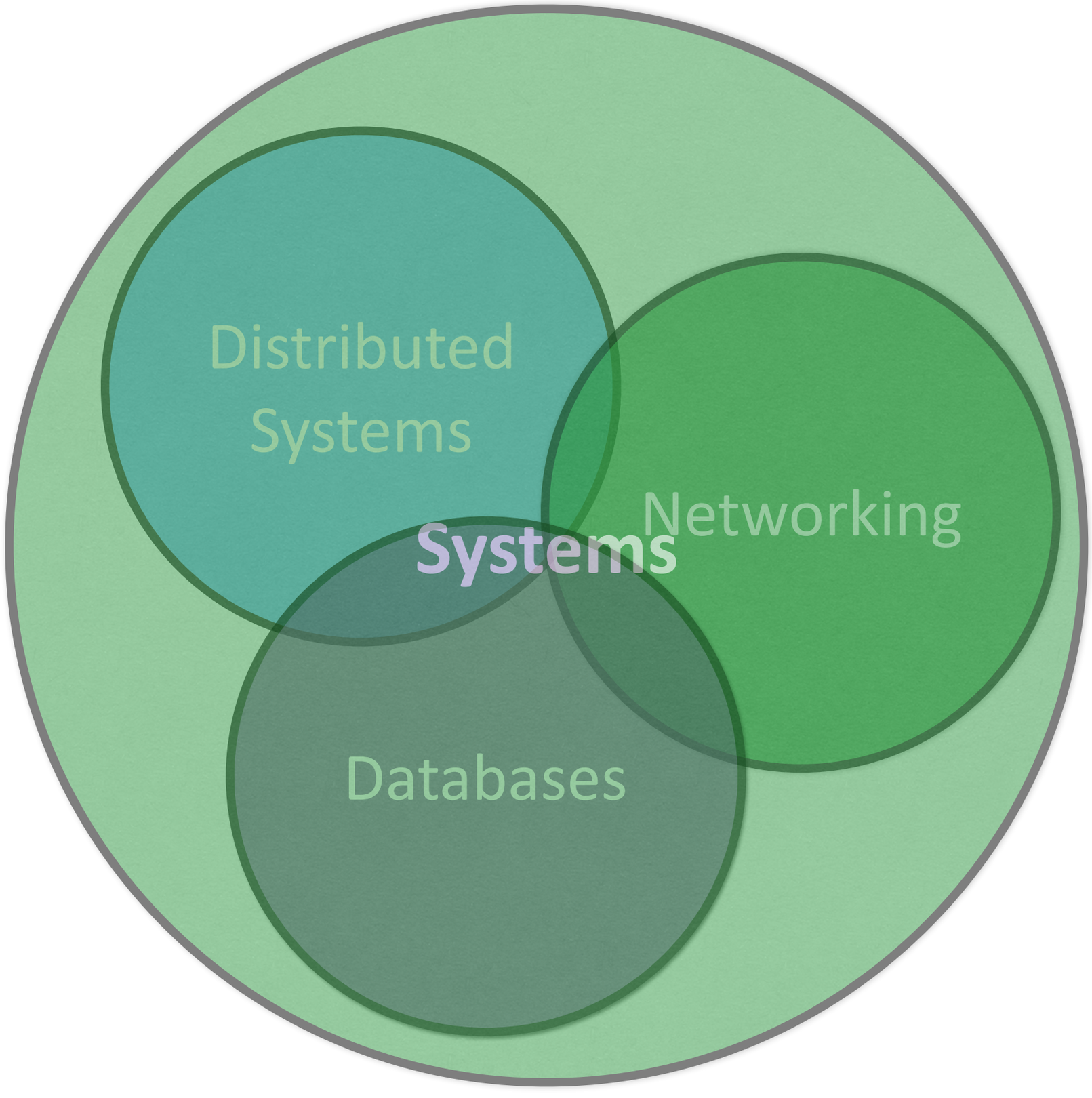
# Why this workshop? #1: Timeliness

- **New tipping point: recent innovations in applications**
  - AR/VR
  - ML and computer vision
  - Self-driving * (* =cars, =networks, =databases)

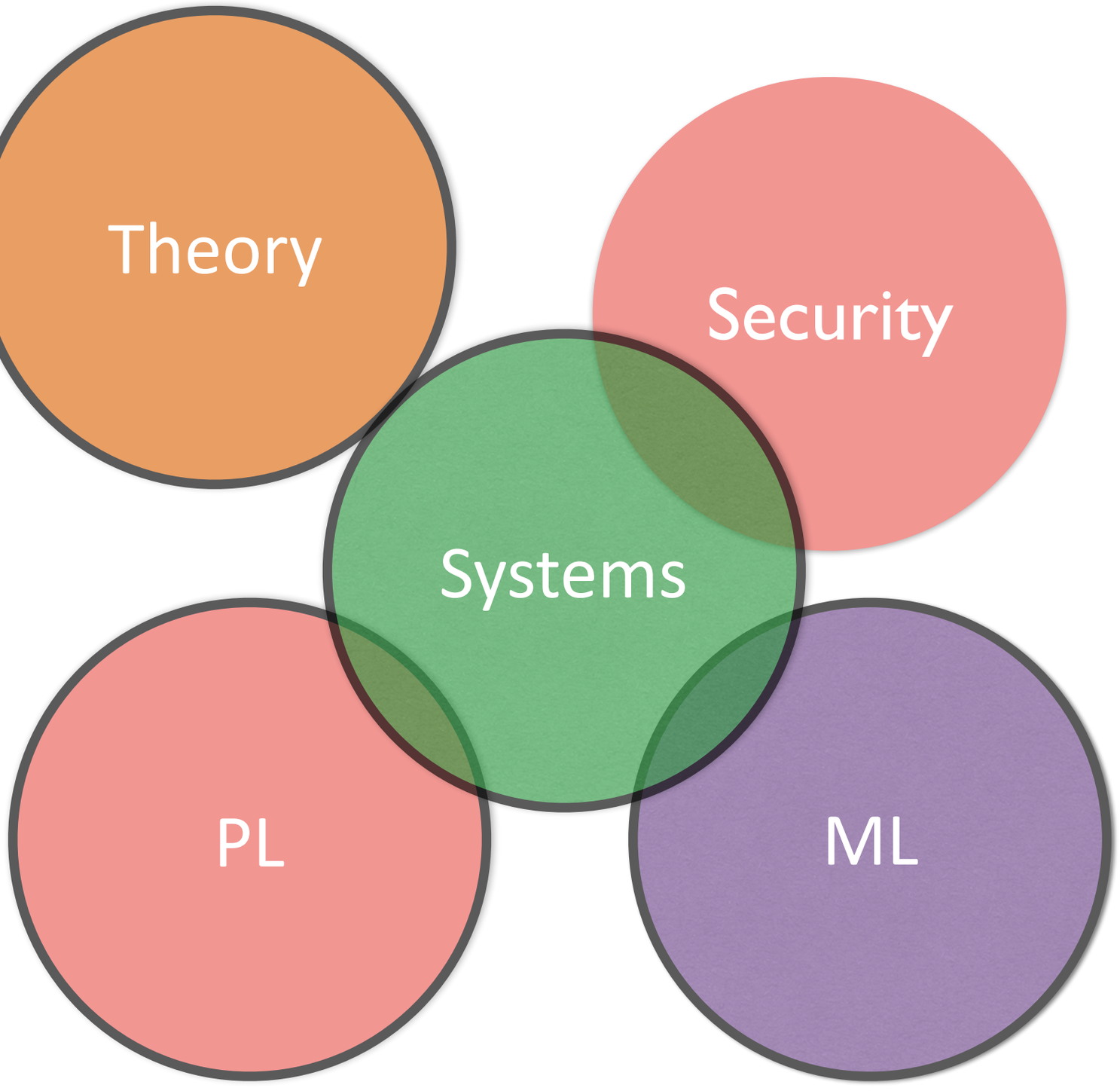
- **New tipping point: recent innovations in hardware infrastructure**
  - End-hosts (e.g., TPUs)
  - Improved storage and memory devices (e.g., 1M IOPS NVMe)
  - Adoption of reconfigurable hw (e.g., FPGA, programmable switches)

- **New tipping point: emerging standardizations and software pipelines**
  - Security/privacy standards: GDPR
  - Wireless and networking standards: 5G
  - End-to-end software pipelines: Tensorflow, ….

# Why this workshop? #2: Join Forces within “systems”



# Why this workshop? #3: Bring Disciplines together



# Plan

- **Talks on use cases**
    - Lili, Minlan, Victor
- **Talks on platforms**
    - Ion, Mike
- **Three breakout sessions**
    - One session for use cases related discussion
    - One session for platform related discussion
    - Read-out session for joint discussion
    - Breakout#3 topic left open — please suggest
- **Hopefully, a lot of hallway discussion**
- **Output: A “report” summarizing our discussions**

# Why this workshop? #3: Setting up an agenda

- **Work across research area "boundaries"**
  - Current siloed areas
  - Great work in each of them
  - Sum of parts less than overall potential output

- **Encourage research programs**
  - Toward a unified goal
  - Bringing intellectual and infrastructure resources together
  - Improve cross-area research funding and appreciation

- **Building tools and techniques**
  - <Needs a bit more thinking>