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Lattice Semiconductor

Mobile Influenced Markets – Evolution of Camera and Display Uses

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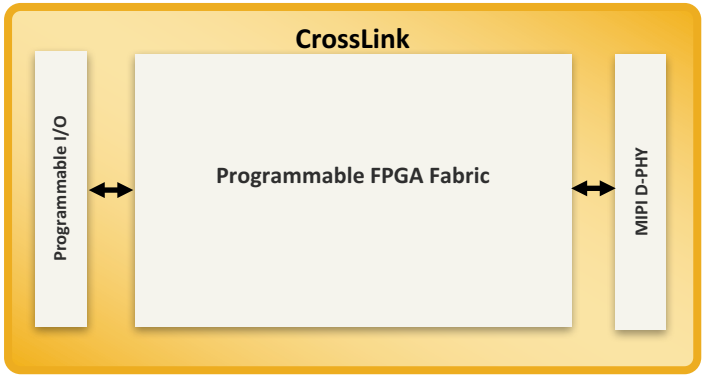
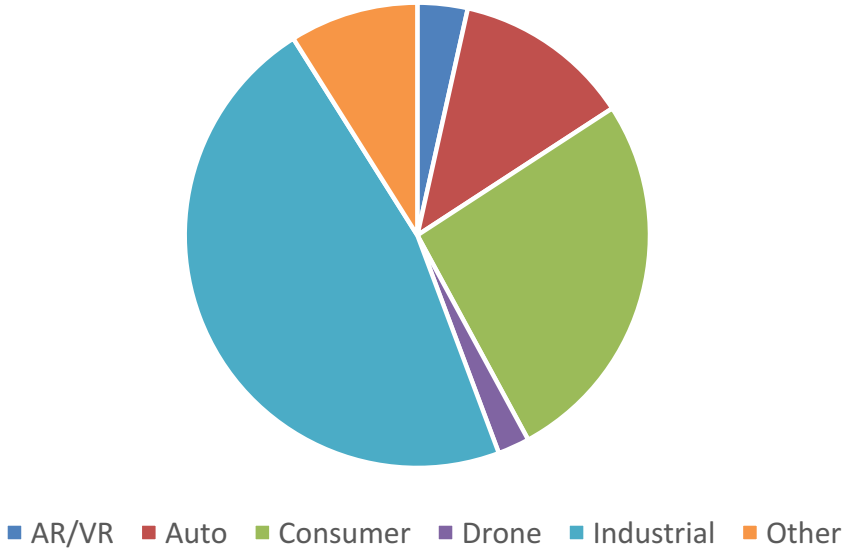
Lattice CrossLink™

CrossLink Block Diagram



- The Lattice CrossLink FPGA will bridge almost anything to MIPI D-PHY℠
- Many of our solutions go outside the traditional mobile market

CrossLink Applications



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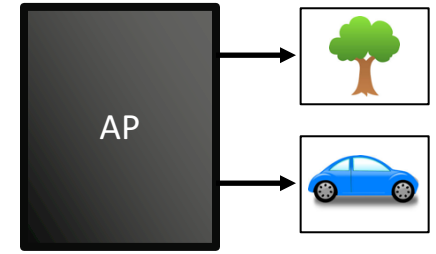
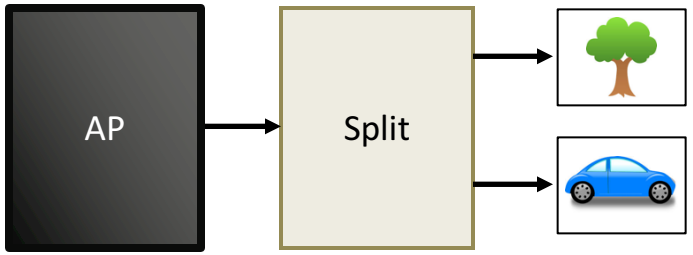
Traditional Display Applications





- Traditional Display applications will include one (maybe two) static displays

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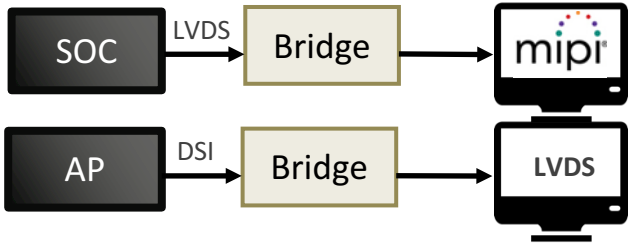
BRIDGING



Appliances

Industrial

- Many consumer, automotive, and industrial applications involve LVDS

Automotive

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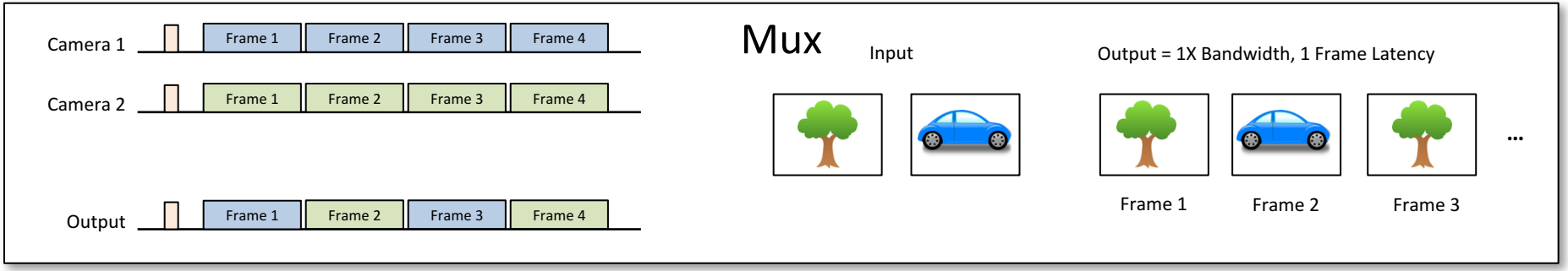
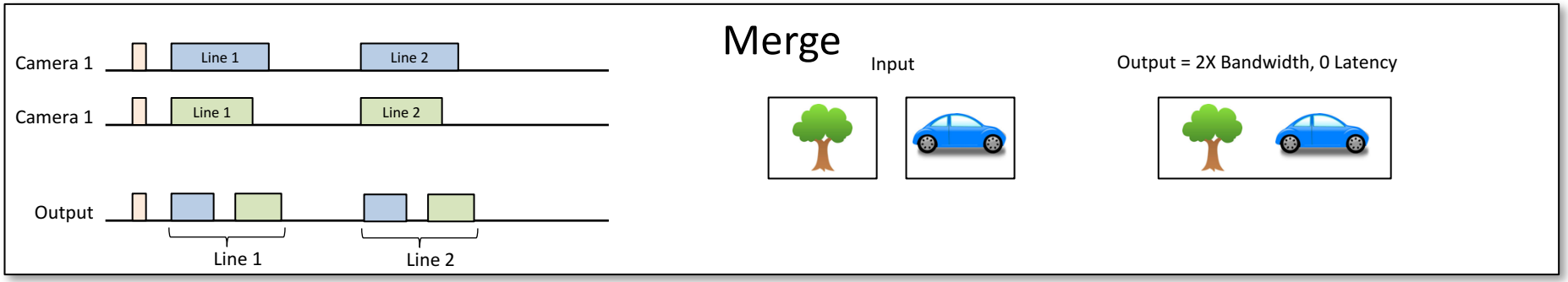
Mux vs Merge

- Video data can be “multiplexed” through a single D-PHY port by mux-ing frame by frame, or merging to super frames.





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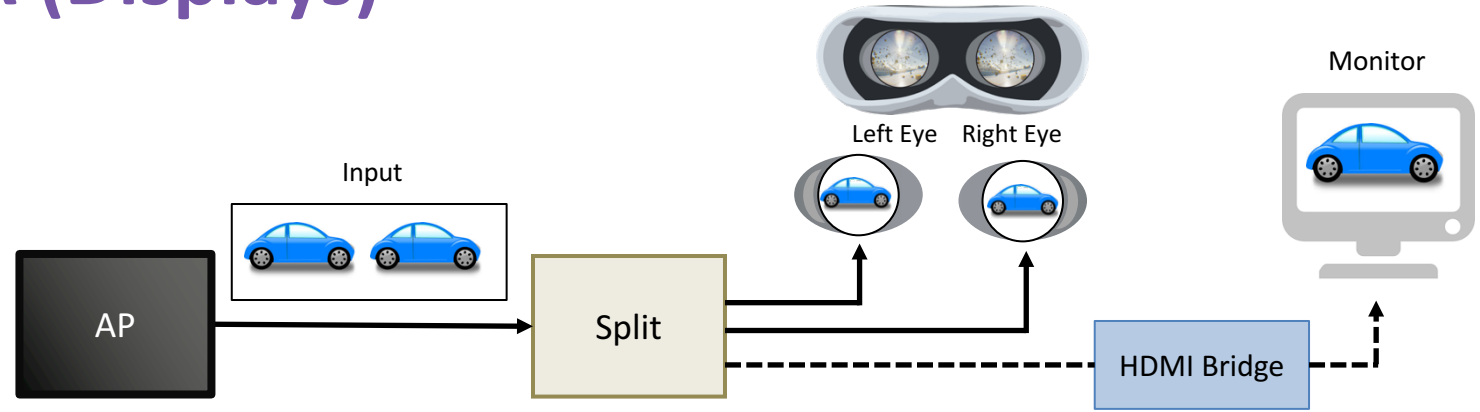
AR/VR (Displays)



Merging is favored method to minimize eye-eye latency.

Minimum frame rate of 75Hz needed to avoid motion sickness.

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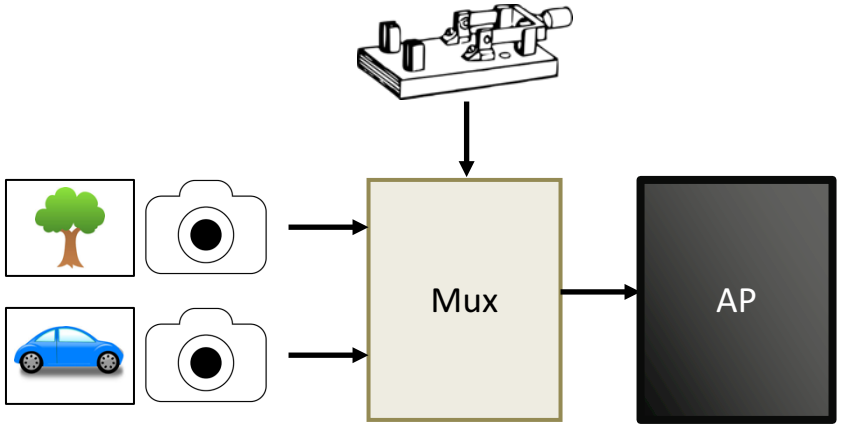
Traditional Camera Applications

Rear Camera

Front Camera



- Traditional Camera applications statically switch from one camera to the other

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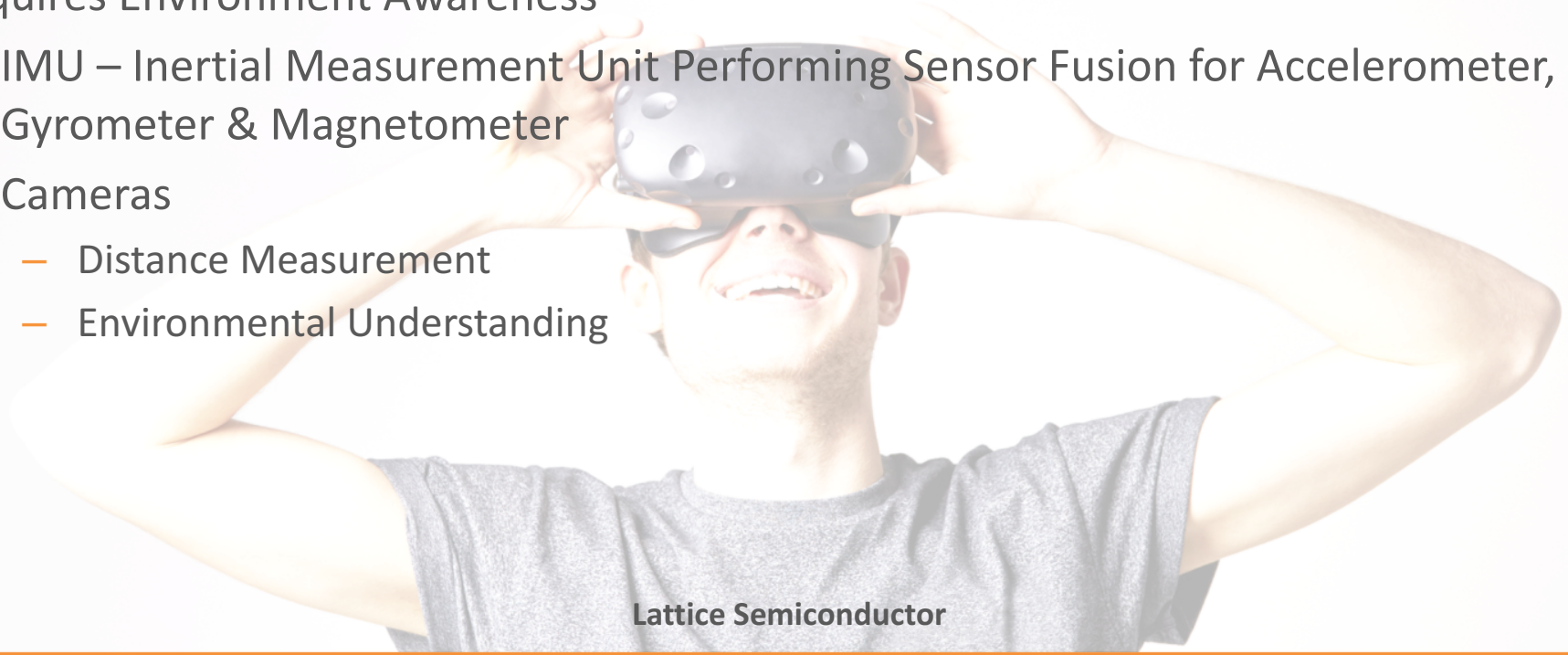
AR/VR (Cameras)

Requires Environment Awareness

- IMU – Inertial Measurement Unit Performing Sensor Fusion for Accelerometer, Gyrometer & Magnetometer
- Cameras
  - Distance Measurement
  - Environmental Understanding



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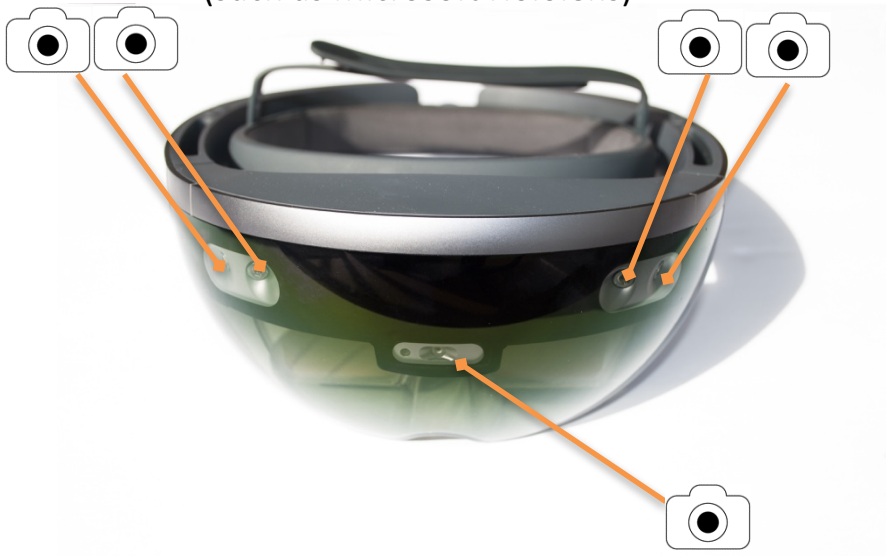
AR/VR Tracking

Outside-In System

Inside-Out System
(such as Microsoft Hololens)



- Two approaches to positional tracking:
  - Outside-In requires external hardware
  - Inside-out is self contained

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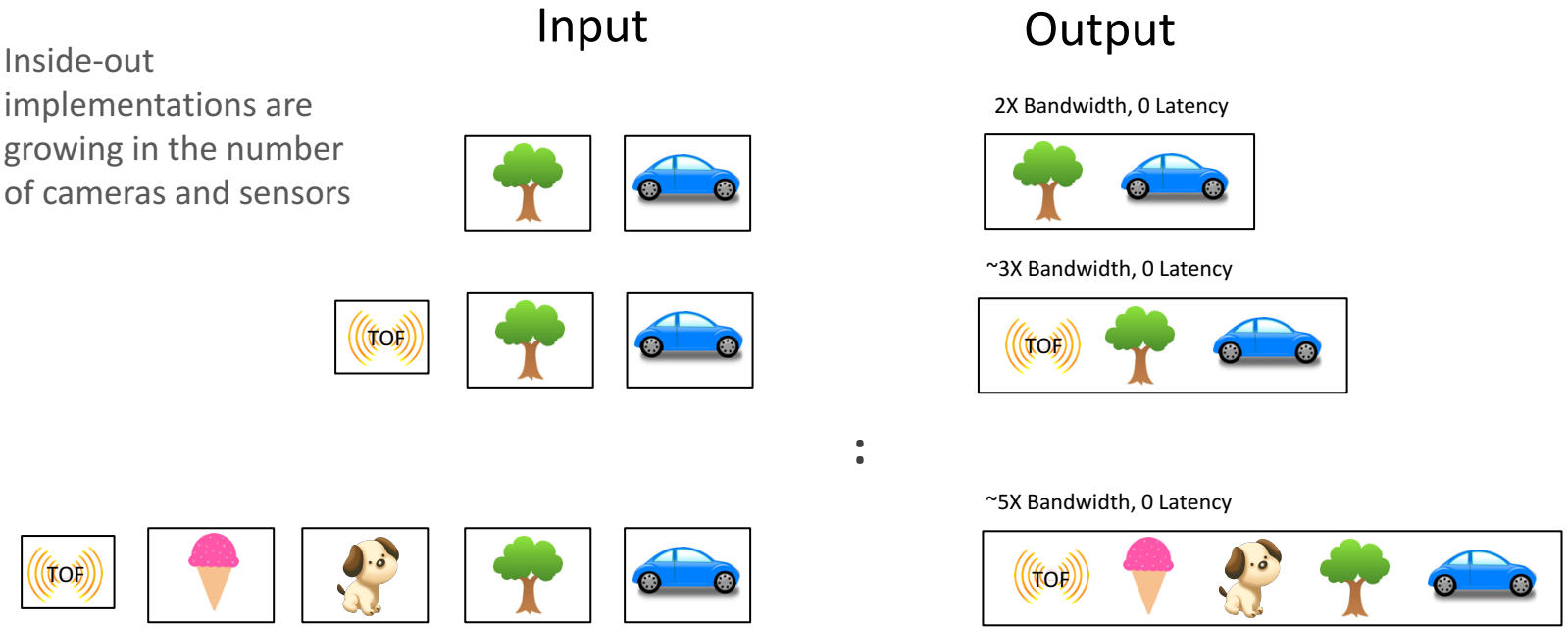
AR/VR Permutations for Inside-Out

- Inside-out implementations are growing in the number of cameras and sensors



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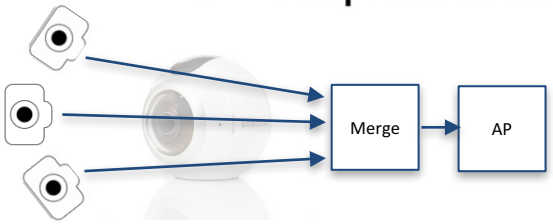
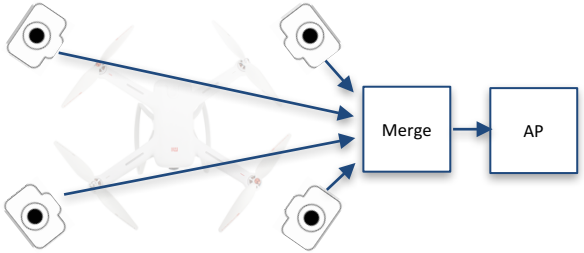
360 Cameras

- Just more cameras



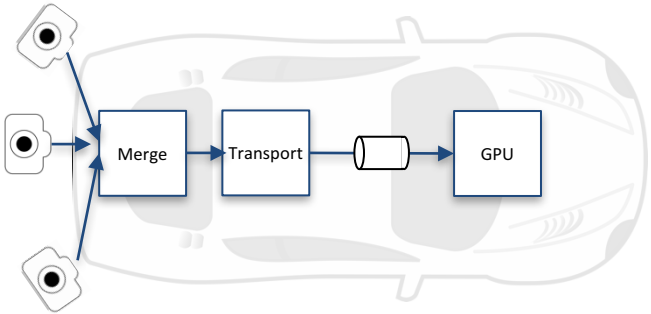
Drones

- Require same things as AR/VR
- Plus more cameras



Automotive

- Require same things as AR/VR
- Plus transport



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Summary

- MIPI Components have become ubiquitous
  - Cameras, Displays, APs, Accelerometers, Gyrometers, Magnetometers …
- Mobile Influenced Markets are leveraging these components in all sorts of ways and combinations
- FPGAs have been instrumental in enabling these new (and unforeseen) markets in ways that simple bridges cannot.

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THANK YOU

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