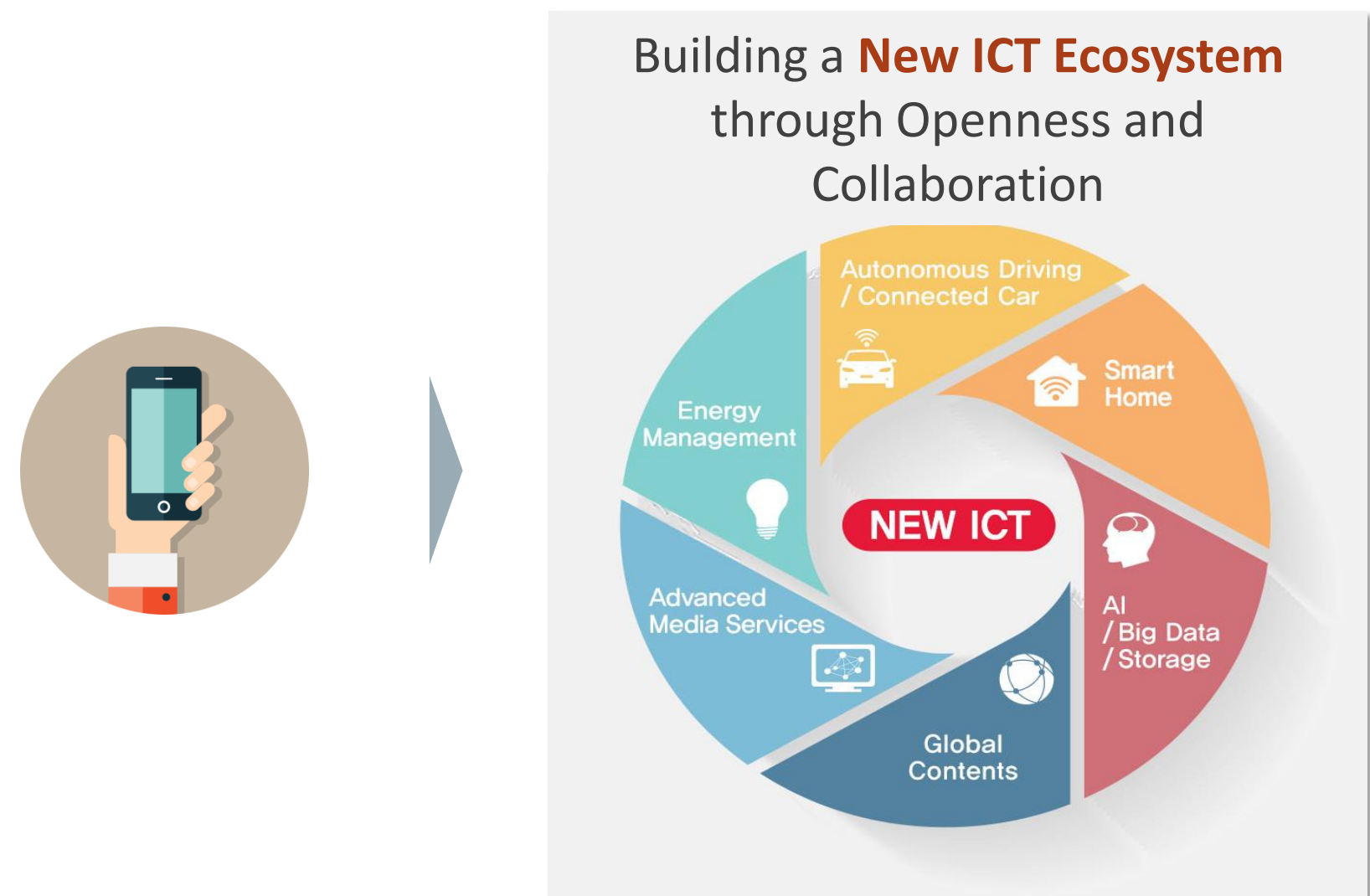


# AIX: FPGA geared-up Neural Network Accelerator for NUGU, the 1<sup>st</sup> Commercial Korean Virtual Personal Assistant (VPA)

## SKT: from Telecommunication Company to AI Service Company

SK telecom is Korea's largest telecommunications company with more than 29 million mobile subscribers, which accounts for around 50 percent of the total market.



### NUGU AI Speaker



### Surveillance Cloud



### Media Services



### Navigation with NUGU



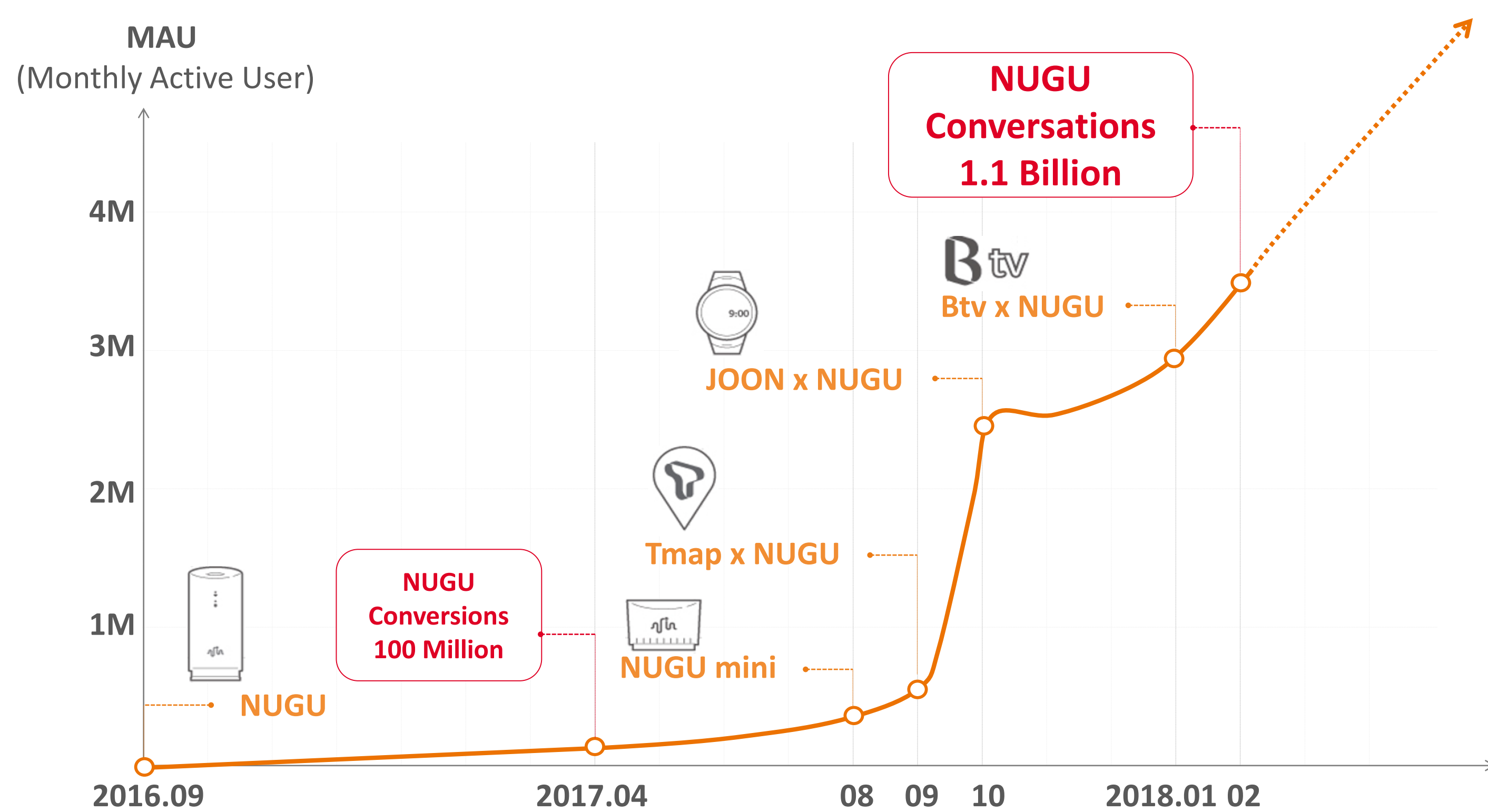
### HD Map



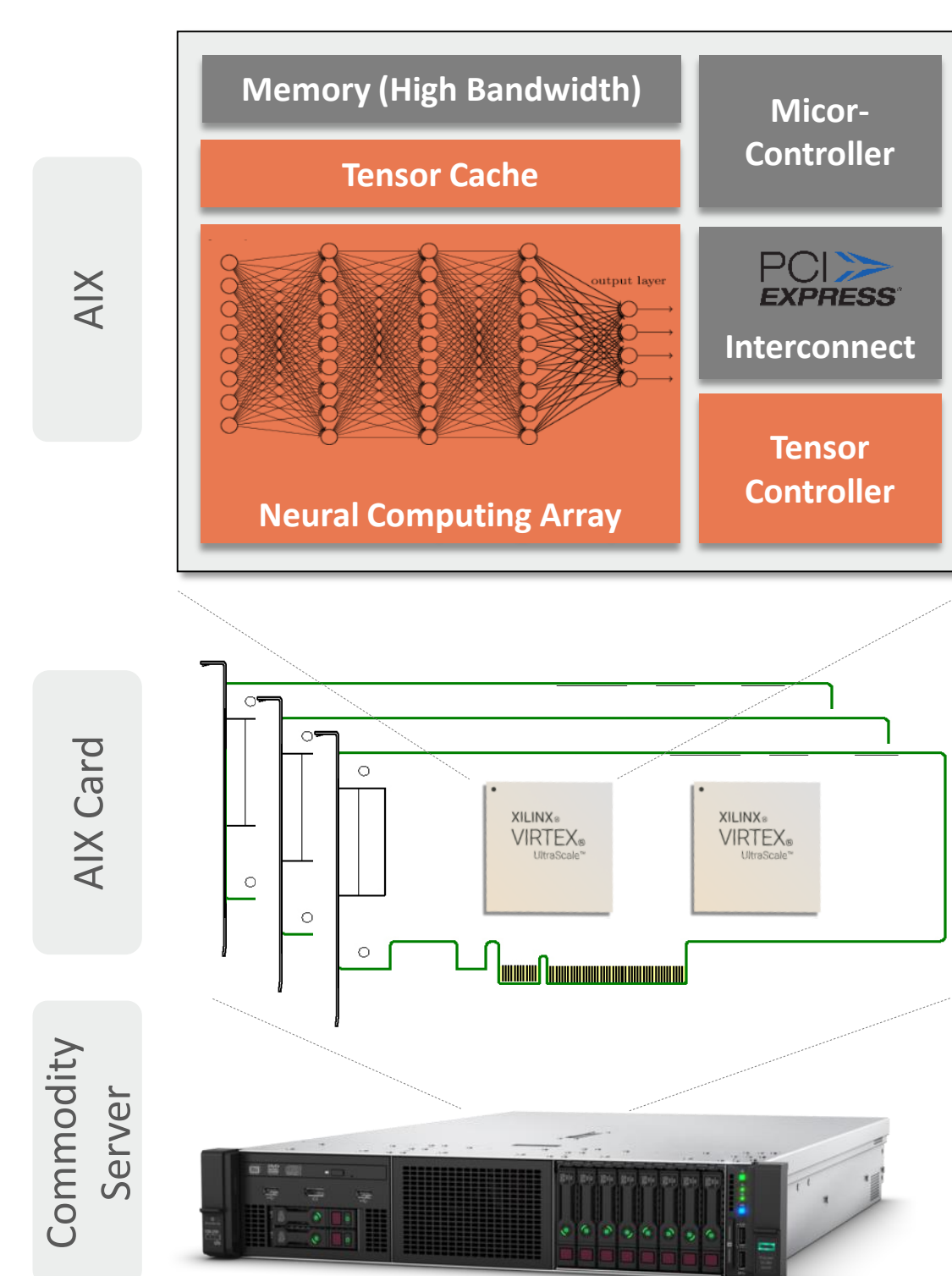
### Self-driving Car



## NUGU AI Assistant



## AIX-F (AI Inference Accelerator FPGA)



### Static Compute Optimization

Computation Graph Optimization  
Quantization, Pruning  
Model Parallel Execution

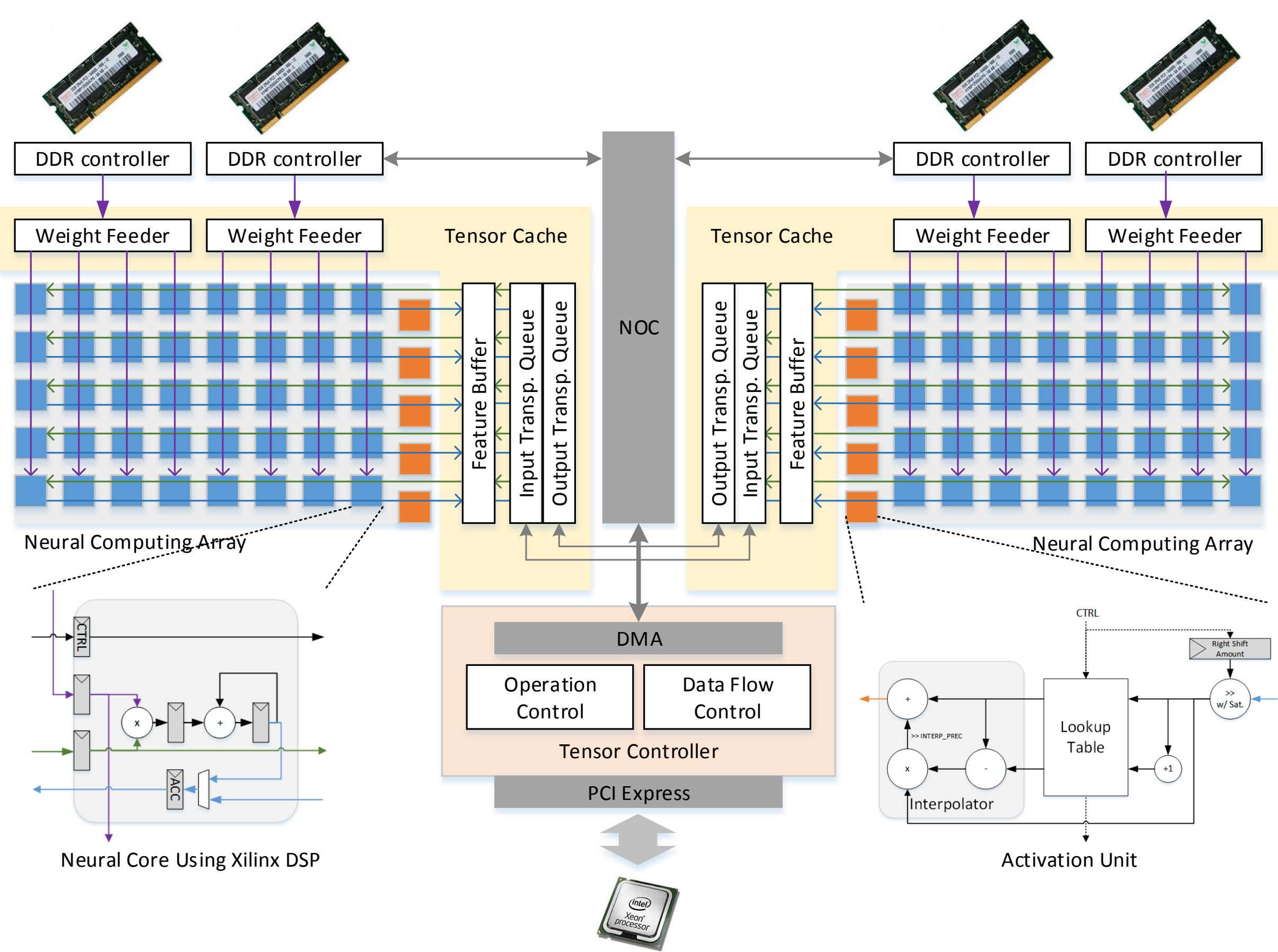
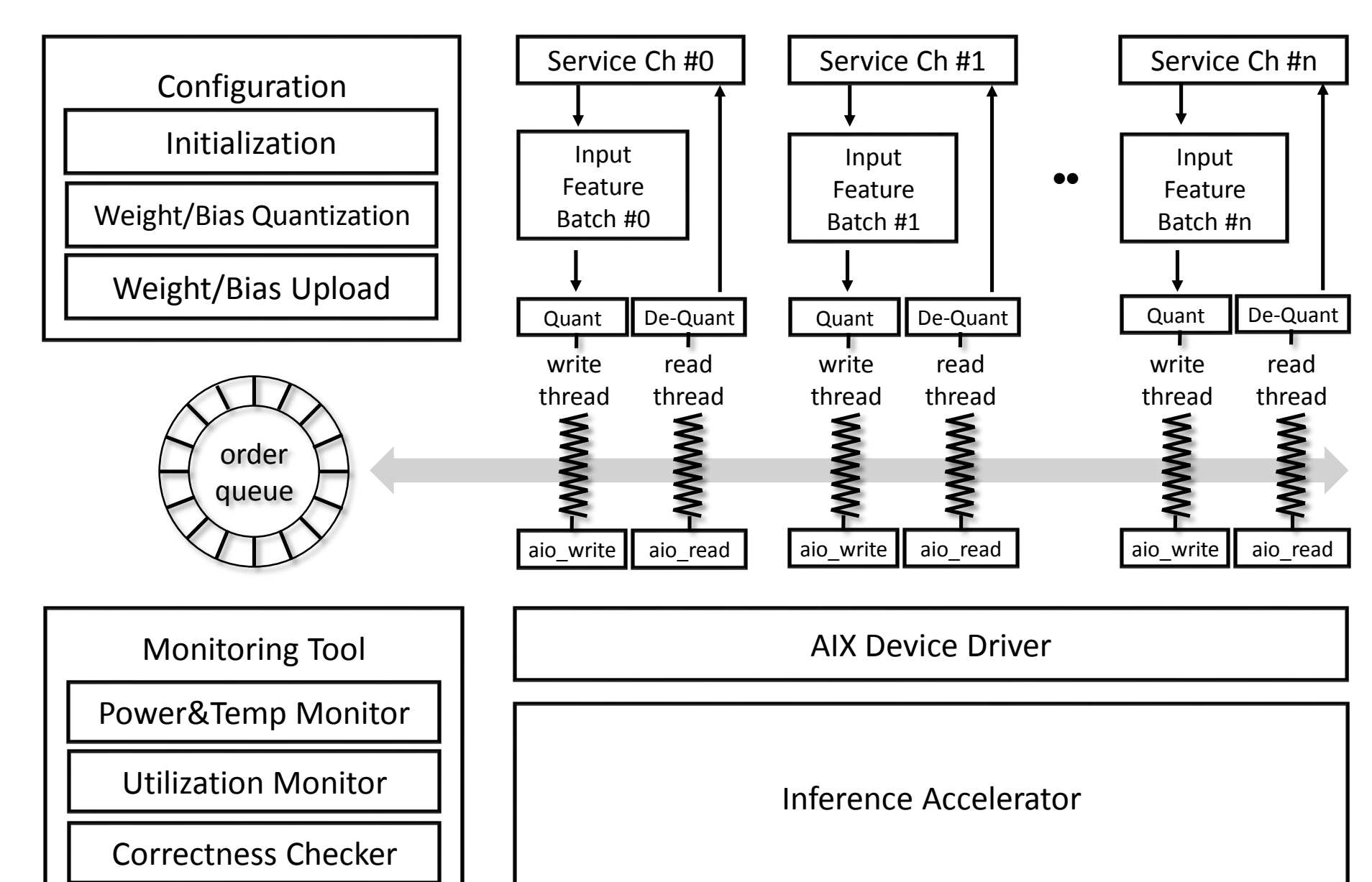
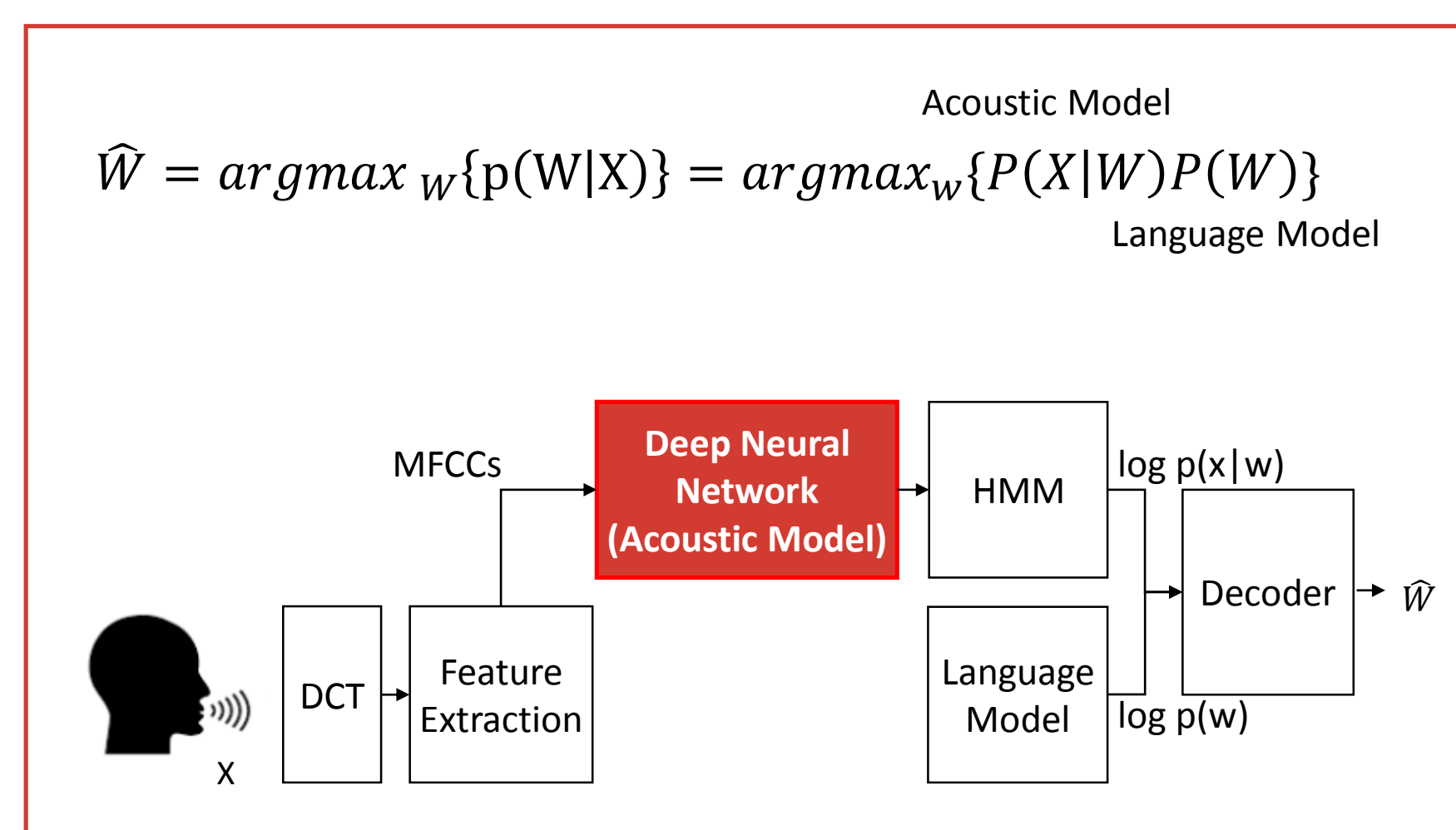
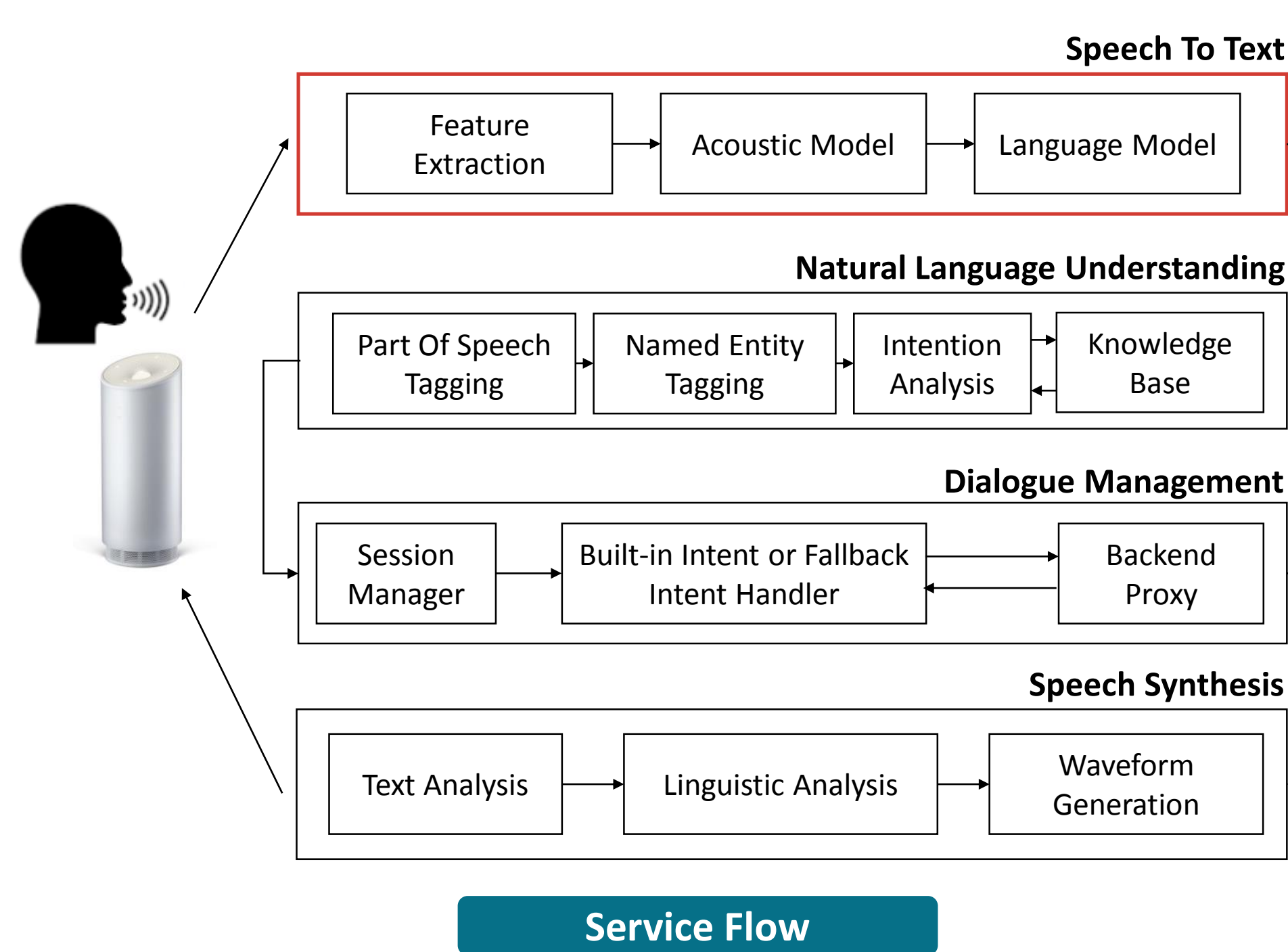
### Dynamic Compute Optimization

Computation Optimization in HW  
INT16 & 2xINT8 Operation  
Dynamic Precision

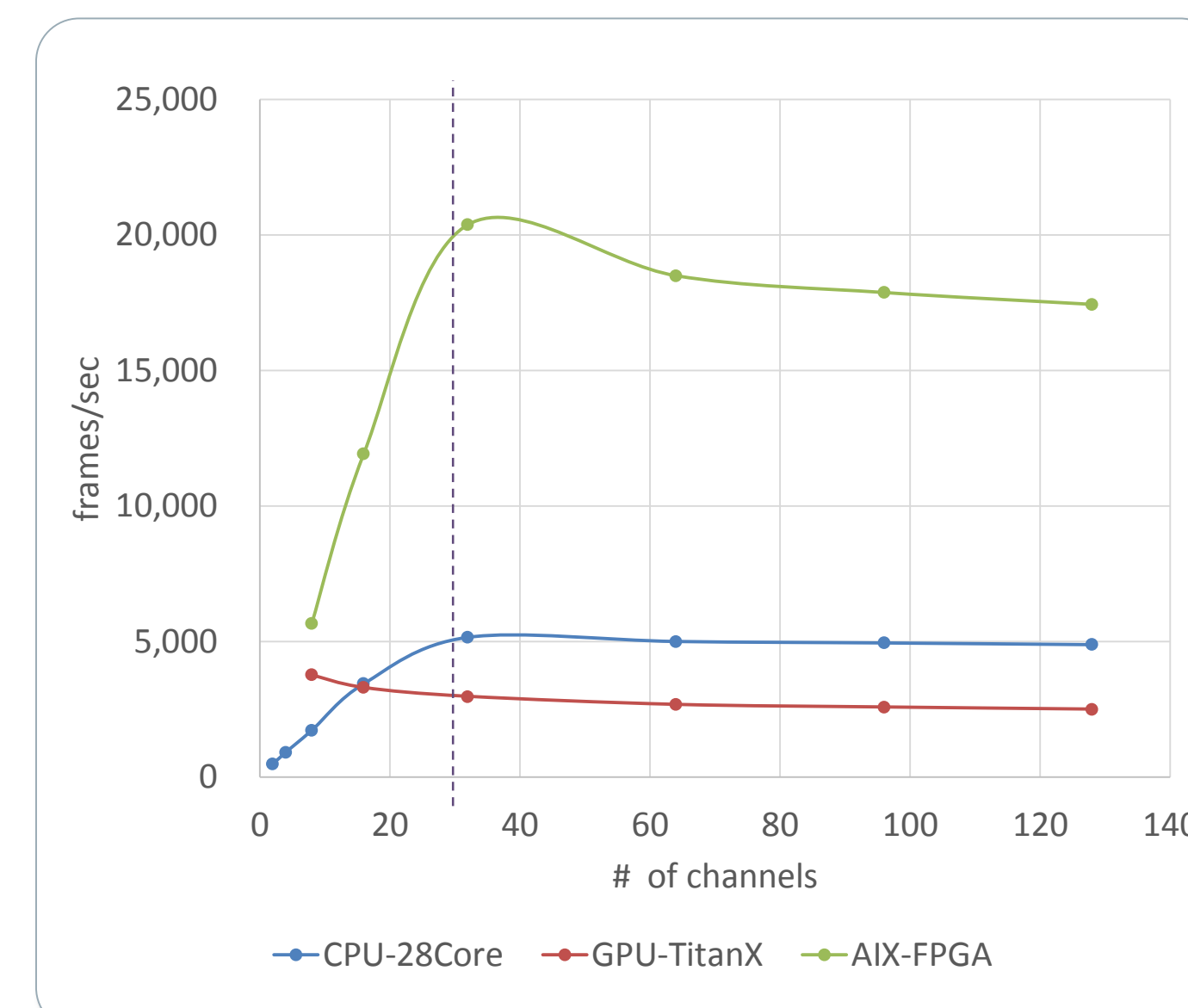
### Ultimate Utilization (Xilinx FPGA)

>95% of DSPs are working every cycle

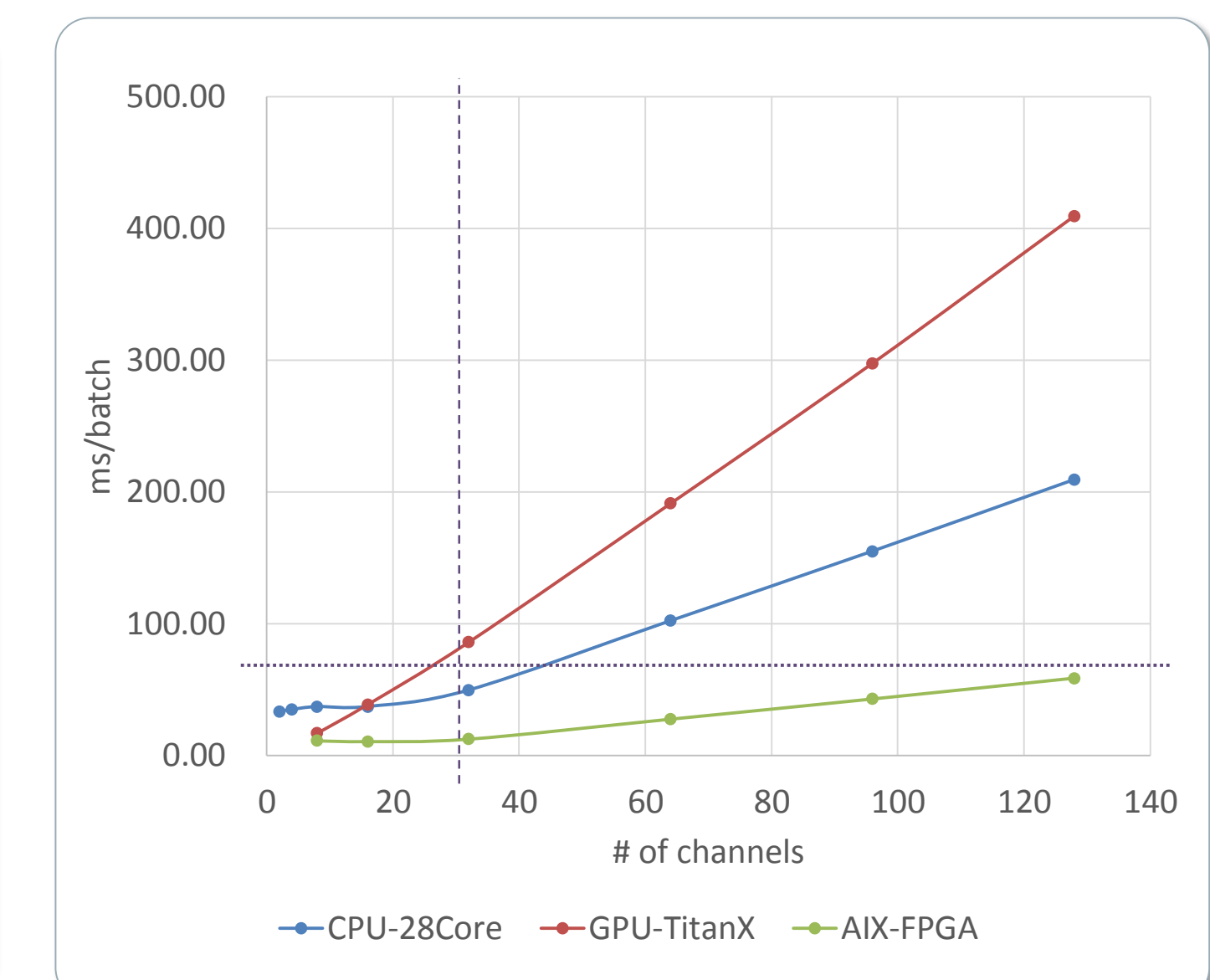
## NUGU ASR Acceleration with AIX-F



Environment: 28-Core CPU, 8-Batch



**Throughput** according to number of concurrent channels



**Latency** according to number of concurrent channels