Chiplet Design Considerations
FPGA use case

Kash Johal (eTopus)
Mao Wang (Quicklogic)
Today's slides share considerations for chiplet developers.

Chiplet Market is booming seems like a great idea to develop one and be early to market for open chiplets.

Barriers –

- IP needed?
- Die to Die standards – which one?
- KGD - Redundancy?
- KYC – know your chiplet?
- Validation platform?
- Marketplace?
IP Needed

- First what process?
- Next Foundry target?
- Packaging – standard, advanced?
- Die2Die PHY? Bump Map? Bump pitch?
- Link Layer?
- Speed?
- Power?
- Clocking – PLL - 2Ghz?

NO CENTRAL INFO RESOURCE
Die2Die standards

- BOW and UCIe
- BOW is more bare metal – more flexible
- Next Gen BOW 2.0 is around the corner
- UCIe is more fixed and less flexible

Consider supporting both – if you want to increase TAM chiplet on open market
● **KGD – known good die**

● Chiplets economics work great when all the chiplets work
● As no rework - economics become a disaster if one fails
● Little secret **ESD is being dramatically reduced for D2D**

● We are working with a partner to run system level test on complete chiplet via Die2Die interface. Make sure chiplet is working fully in package. Can run @ power up & self test.

● **Build in Redundancy into chiplet design** – failure is not an option. Small chiplets especially critical. Not just at die2die interface. Advanced packaging more difficult to test.
KYC – know your chiplets

- As chiplets will be stored in die form
- Supply chain is important but not infallible
- Root of Trust security will be important

- We are working with a partner to secure our chiplets with unique identifier - technology is already out there

- Do consider root of trust or it could limit your market
Validation of your chiplet?

- Currently no easy validation system exists
- We hope to have one by mid 2024
- Third party chiplets, ASICs, I/O chiplets
**Choices**

- Single FPGA Chiplet
- Smaller FPGA Chiplets
- Redundant Architecture
  - Any 2 of 3 must work
  - Program can be loaded depending on failure
  - Failure not an option
Open Marketplace?

- Ooops there is no OPEN chiplet market yet
- **Coming soon** …. Hopefully