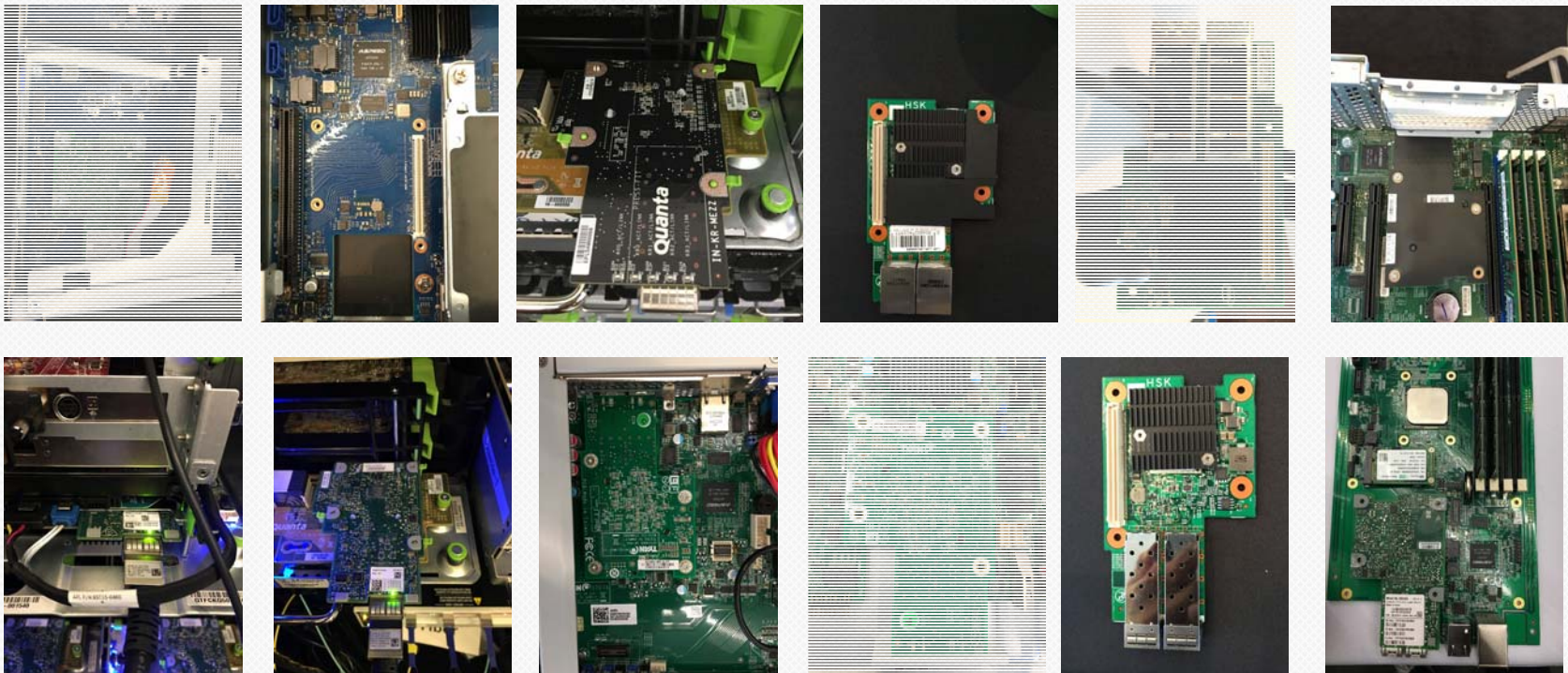# OCP U.S. SUMMIT 2016

March 9-10 | San Jose, CA

OCP U.S. SUMMIT 2016

OCP Mezz 2.0 Update

Jia Ning
Hardware Engineer, Facebook Inc.

OCP Mezz NIC/Baseboard in 2016 Summit

Agenda

- Spec changes in past 1 year
- KR Mezzanine NIC and Connector C
- 3D package
- System compatibility with OCP Mezz 2.0
- Q&A for implementation

Mezz 2.0 Major Spec Change Since 2015 summit

- Rev0.45(8/30/2015)
  - **Add 25G/50G/100G support**
  - Add Connector C for KR Mezzanine
  - Add 5mm stack (Type 4)

Figure 19: Placement of QSFP+ 28Gbps Type A and Type B

Mezz 2.0 Major Spec Change Since 2015 summit

- Rev0.45(8/30/2015)
  - Add 25G/50G/100G support
  - Add Connector C for KR Mezzanine
  - Add 5mm stack (Type 4)

Figure 5: Optional Areas in Horizontal Plane

Figure 25: Port and LED location of Quad RJ45 Mezzanine card

Mezz 2.0 Major Spec Change Since 2015 summit

- Rev0.45(8/30/2015)
  - Add 25G/50G/100G support
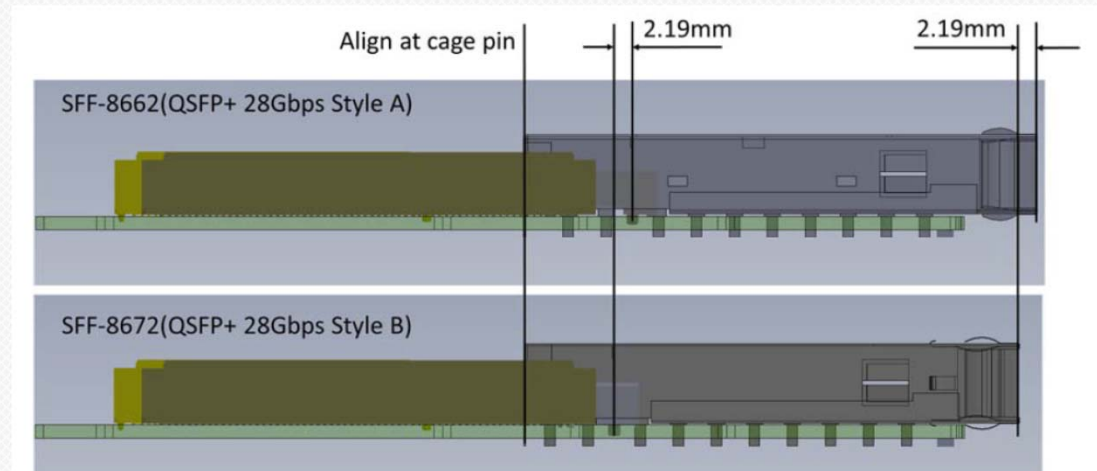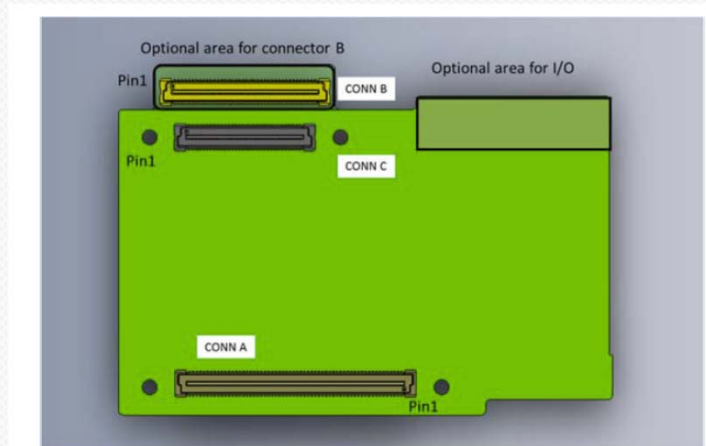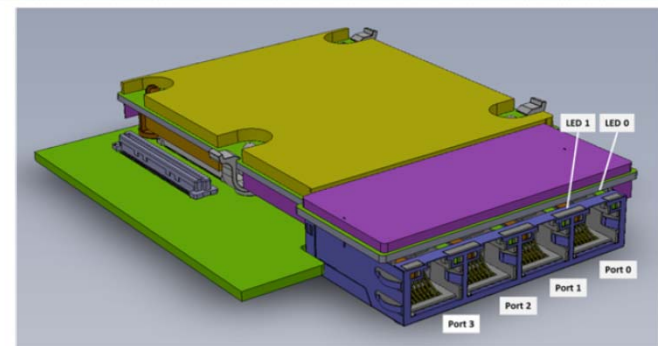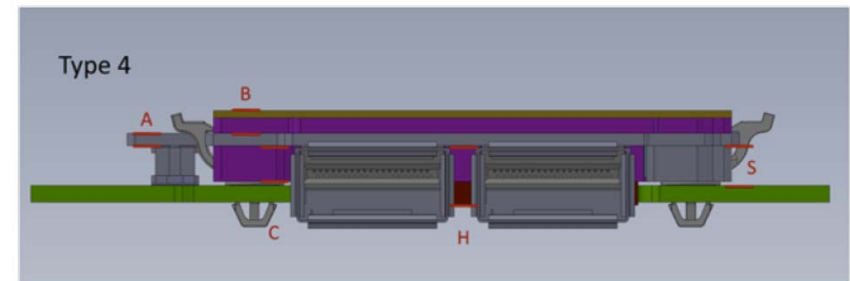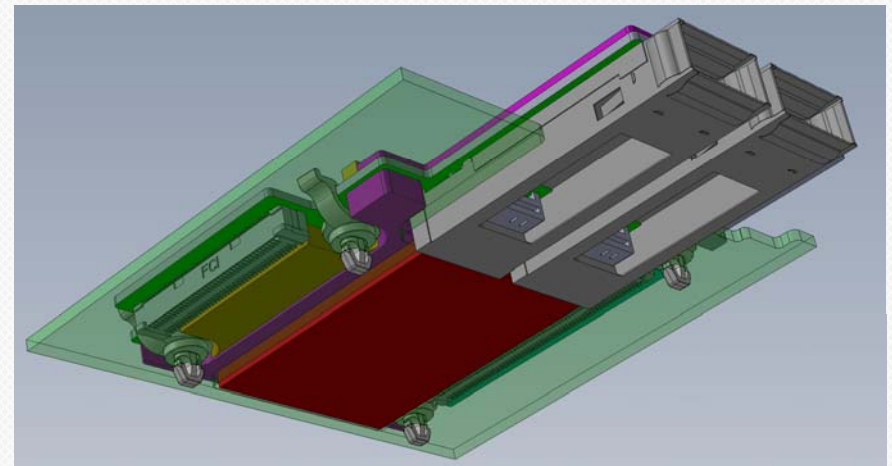 - Add Connector C for KR Mezzanine
  - Add 5mm stack (Type 4)

Figure 11: Type 4 Vertical Stack Front View
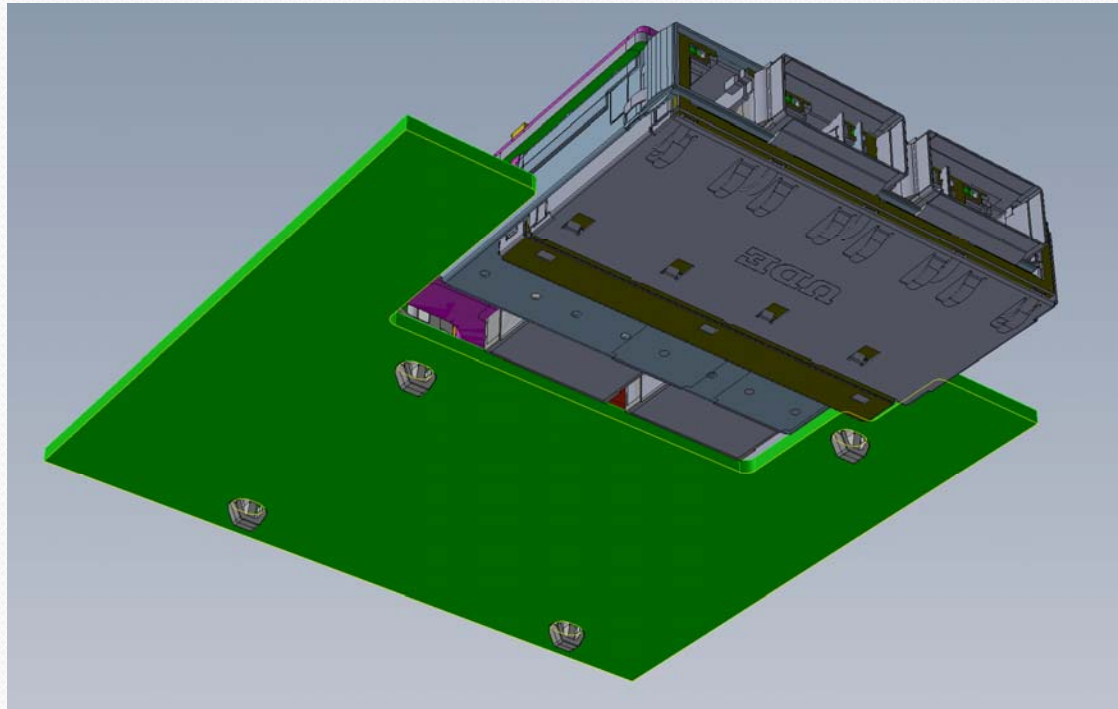
Mezz 2.0 Major Spec Change Since 2015 summit

- Rev0.46~0.95 (10/31/2015)
  - Add implementation example table
  - Add M1/M2 for max profile of Type 1 and Type 2 cards

| ID	Description	Network Port Shown	Mezzanine card Connectors shown			Baseboard Connectors shown			Vertical Stacking	Heatsink keepout Height	File name
			A	B	C	A	B	C			
	PCIe Mezz NIC										
P1	Single/Dual ports 10G/25G SFP+/SFP28	2x SFP+/SFP28	X	N/A	N/A	X	X	X	Type 1(8mm)	7.5mm	P1_T1_10G_SFP+_25G_SFP28_10232015
P2	Single/Dual ports 40G QSFP	2x QSFP+	X	N/A	N/A	X	X	X	Type 1(8mm)	7.5mm	P2_T1_40G_QSFP+_10232015
P3	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	X	Type 1(8mm)	7.5mm	P3_T1_50G_100G_QSFP28_B_10232015
P4	Single/Dual ports 50G/100G QSFP28_A	2x SFF-8662(QSFP+ 28Gbps Style A)	X	X	N/A	X	X	X	Type 1(8mm)	7.5mm	P4_T1_50G_100G_QSFP28_A_10232015
P5	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	X	Type 2(12mm)	11.5mm	P5_T2_50G_100G_QSFP28_B_10232015
P6	Quad ports 10G/25G SFP+	1x 1x4 SFP+	X	X	N/A	X	X	X	Type 3 (8mm)	7.5mm	P6_T3_4x10G_4xSFP+_10232015
P7	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P7_T4_50G_100G_QSFP28_B_11172015
P8	Single/Dual ports 50G/100G QSFP28_A	2x SFF-8662(QSFP+ 28Gbps Style A)	X	X	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P8_T4_50G_100G_QSFP28_A_11172015
P9	Single/Dual ports 10G/25G SFP+/SFP28	2x SFP+/SFP28	X	N/A	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P9_T4_10G_SFP+_25G_SFP28_11172015
	KR Mezz										
K1	4x KR Mezz in Connector A+B	1x QSFP	X	X	N/A	X	X	X	Type 2(12mm)	11.5mm	K1_T2_4x10G_QSFP+_10232015
K2	Quad SFP+ KR Mezz in Connector C	1x 1x4 SFP+	N/A	N/A	X	X	X	X	Type 1(8mm)	7.5mm	K2_T1_4x10G_4xSFP+_10232015
K3	Quad 10GBaseT KR Mezz in Connector C	1x 1x4 RJ45	N/A	N/A	X	X	X	X	Type 1(8mm)	7.5mm	K3_T1_4x10G_4xRJ45_10232015
K4	Quad SFP+ KR Mezz in Connector C	1x 1x4 SFP+	N/A	N/A	X	X	X	X	Type 2(12mm)	11.5mm	K4_T2_4x10G_4xSFP+_10232015
K5	Quad 10GBaseT KR Mezz in Connector C	1x 1x4 RJ45	N/A	N/A	X	X	X	X	Type 2(12mm)	11.5mm	K5_T2_4x10G_4xRJ45_10232015
	Max Mezz Profile										
M1	Max Mezz Profile of all Type 1		X	X	X	X	X	X	Type 1(8mm)	7.5mm	M1_T1_MAX MEZZ PROFILE_20151130
M2	Max Mezz Profile of all Type 2		X	X	X	X	X	X	Type 2(12mm)	11.5mm	M2_T2_MAX MEZZ PROFILE_20151130

Mezz 2.0 Major Spec Change Since 2015 summit

- Rev0.46~0.95 (10/31/2015)
  - Add implementation example table
  - Add M1/M2 for max profile of Type 1 and Type 2 cards

Mezz 2.0 Major Spec Change Since 2015 summit

- Rev1.00 (12/15/2015)
  - Rev1.00 release
- Rev1.01 (draft)
  - Add 4x10GBase-T RJ45 with LED implementation examples
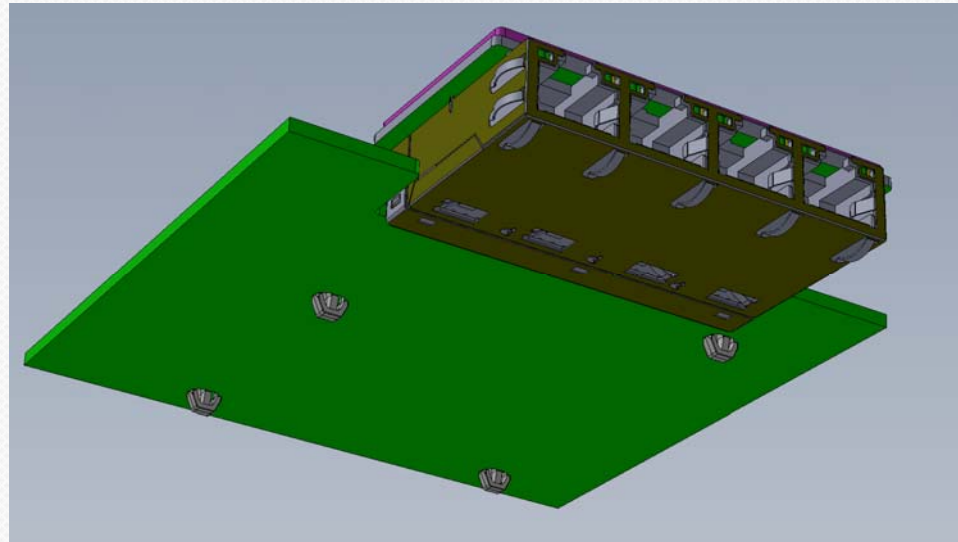
KR Mezzanine NIC and Connector C

- Driven by community demands
- Electrical
  - Up to 4x KR lanes
  - Side band signals (LED, I2C, MDIO, SDP) included
  - Works independently
- Mechanical
  - Does not increase Mezz PCB outline
  - Does not conflict with PCIe Mezz in 8/12mm stacking(Type1/2)

Connector C			
Signal	Pin	Pin	Signal
P12V_AUX/P5V_AUX-P12V	C33	C1	MEZZ_SMCLK
P12V_AUX/P5V_AUX-P12V	C34	C2	MEZZ_SMDATA
P12V_AUX/P5V_AUX-P12V	C35	C3	EXT_MDIO_I2C_SEL
RSVD	C36	C4	GND
SDP0	C37	C5	KR_TX_DP<2>
SDP1	C38	C6	KR_TX_DN<2>
GND	C39	C7	GND
KR_TX_DP<0>	C40	C8	LED_P1_0_N
KR_TX_DN<0>	C41	C9	LED_P1_1_N
GND	C42	C10	GND
LED_P0_0_N	C43	C11	KR_TX_DP<3>
LED_P0_1_N	C44	C12	KR_TX_DN<3>
GND	C45	C13	GND
KR_TX_DP<1>	C46	C14	LED_P2_0_N
KR_TX_DN<1>	C47	C15	LED_P2_1_N
GND	C48	C16	GND
SHARED_KR_MDC_0	C49	C17	KR_RX_DP<2>
SHARED_KR_MDIO_0	C50	C18	KR_RX_DN<2>
GND	C51	C19	GND
KR_RX_DP<0>	C52	C20	Module_SCL0
KR_RX_DN<0>	C53	C21	Module_SDA0
GND	C54	C22	GND
LED_P3_0_N	C55	C23	KR_RX_DP<3>
LED_P3_1_N	C56	C24	KR_RX_DN<3>
GND	C57	C25	GND
KR_RX_DP<1>	C58	C26	Module_SCL1
KR_RX_DN<1>	C59	C27	Module_SDA1
GND	C60	C28	GND
Module_SCL2	C61	C29	Module_SCL3
Module_SDA2	C62	C30	Module_SDA3
GND	C63	C31	SDP2
MEZZ_PRSNTC2_N	C64	C32	SDP3

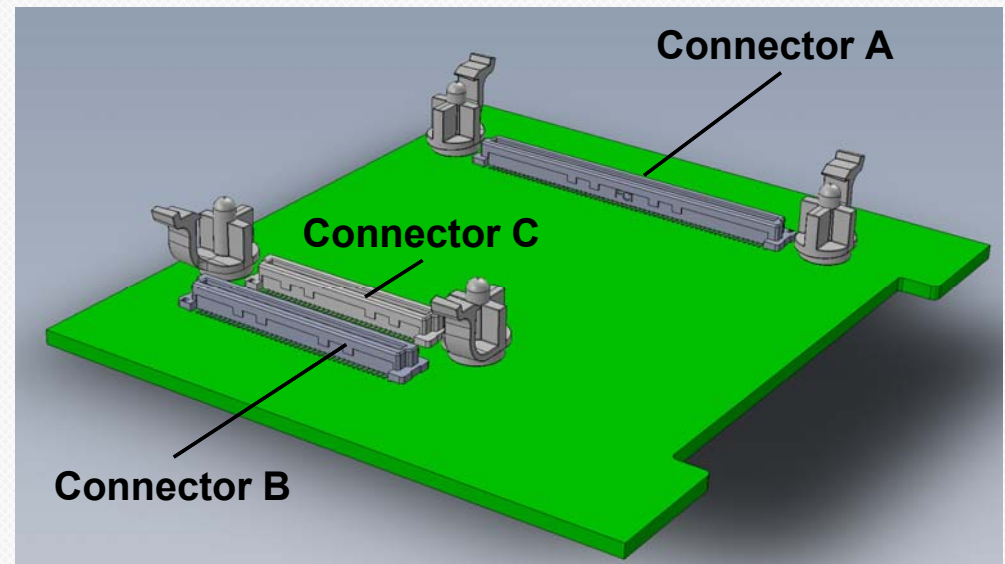# KR Mezzanine NIC and Connector C

- Driven by community demands
- Electrical
  - Up to 4x KR lanes
  - Side band signals (LED, I2C, MDIO, SDP) included
  - Works independently
- Mechanical
  - Does not increase Mezz PCB outline
  - Does not conflict with PCIe Mezz in 8/12mm stacking(Type1/2)

KR Mezzanine NIC and Connector C

- Up to 4x 10G SFP+ or 10GBaseT
  - Type 1(8mm) and Type 2(12mm) stack defined
  - RJ45 with/without build in LED

4x 10G SFP+

4x 10GBaseT
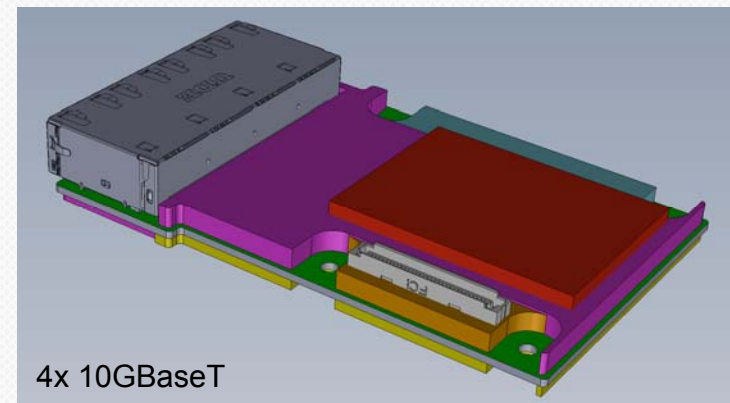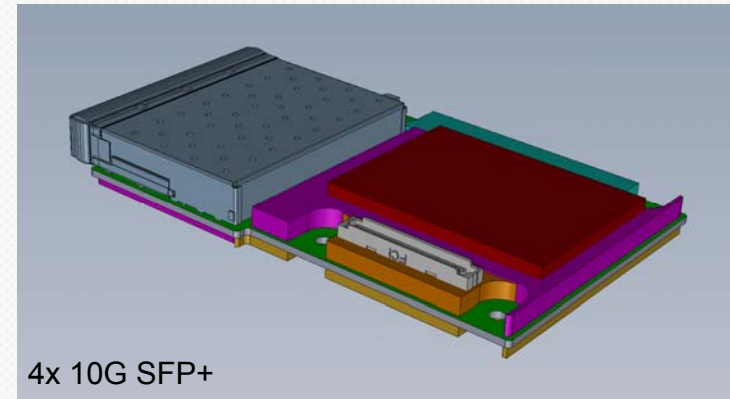
3D package

- Why
  - Being explicitly clear on mechanical requirements of typical Mezz NICs
  - Make system implementation easier to support Mezz NICs
- What
  - 3D models with max profile, and key components' locations to follow
  - STEP and EASM for each model
  - Not exclusive

ID	Description	Network Port Shown	Mezzanine card Connectors shown			Baseboard Connectors shown			Vertical Stacking	Heatsink keepout Height	File name
			A	B	C	A	B	C			
ID	PCIe Mezz NIC										
P1	Single/Dual ports 10G/25G SFP+/SFP28	2x SFP+/SFP28	X	N/A	N/A	X	X	X	Type 1(8mm)	7.5mm	P1_T1_10G_SFP+_25G_SFP28_10232015
P2	Single/Dual ports 40G QSFP	2x QSFP+	X	N/A	N/A	X	X	X	Type 1(8mm)	7.5mm	P2_T1_40G_QSFP+_10232015
P3	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	X	Type 1(8mm)	7.5mm	P3_T1_50G_100G_QSFP28_B_10232015
P4	Single/Dual ports 50G/100G QSFP28_A	2x SFF-8662(QSFP+ 28Gbps Style A)	X	X	N/A	X	X	X	Type 1(8mm)	7.5mm	P4_T1_50G_100G_QSFP28_A_10232015
P5	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	X	Type 2(12mm)	11.5mm	P5_T2_50G_100G_QSFP28_B_10232015
P6	Quad ports 10G/25G SFP+	1x 1x4 SFP+	X	X	N/A	X	X	X	Type 3 (8mm)	7.5mm	P6_T3_4x10G_4xSFP+_10232015
P7	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P7_T4_50G_100G_QSFP28_B_11172015
P8	Single/Dual ports 50G/100G QSFP28_A	2x SFF-8662(QSFP+ 28Gbps Style A)	X	X	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P8_T4_50G_100G_QSFP28_A_11172015
P9	Single/Dual ports 10G/25G SFP+/SFP28	2x SFP+/SFP28	X	N/A	N/A	X	N/A	N/A	Type 4(5mm)	7.5mm	P9_T4_10G_SFP+_25G_SFP28_11172015
	KR Mezz										
K1	4x KR Mezz in Connector A+B	1x QSFP	X	X	N/A	X	X	X	Type 2(12mm)	11.5mm	K1_T2_4x10G_QSFP+_10232015
K2	Quad SFP+ KR Mezz in Connector C	1x 1x4 SFP+	N/A	N/A	X	X	X	X	Type 1(8mm)	7.5mm	K2_T1_4x10G_4xSFP+_10232015
K3	Quad 10GBaseT KR Mezz in Connector C	1x 1x4 RJ45	N/A	N/A	X	X	X	X	Type 1(8mm)	7.5mm	K3_T1_4x10G_4xRJ45_10232015
K4	Quad SFP+ KR Mezz in Connector C	1x 1x4 SFP+	N/A	N/A	X	X	X	X	Type 2(12mm)	11.5mm	K4_T2_4x10G_4xSFP+_10232015
K5	Quad 10GBaseT KR Mezz in Connector C	1x 1x4 RJ45	N/A	N/A	X	X	X	X	Type 2(12mm)	11.5mm	K5_T2_4x10G_4xRJ45_10232015
	Max Mezz Profile										
M1	Max Mezz Profile of all Type 1		X	X	X	X	X	X	Type 1(8mm)	7.5mm	M1_T1_MAX MEZZ PROFILE_20151130
M2	Max Mezz Profile of all Type 2		X	X	X	X	X	X	Type 2(12mm)	11.5mm	M2_T2_MAX MEZZ PROFILE_20151130

3D package

- P1~P9
  - Typical 9 kinds of PCIe Mezzanine NICs
- K1~K5
  - Typical 5 kinds of KR Mezzanine cards
- M1/M2
  - Baseboard implementation recommendation to support all Type 1 or all Type 2 cards

	Description	Network Port Shown	Mezzanine card Connectors shown			Baseboard Connectors shown			Vertical Stacking	Heatsink keepout Height	File name
			A	B	C	A	B	C			
ID	PCIe Mezz NIC										
P1	Single/Dual ports 10G/25G SFP+/SFP28	2x SFP+/SFP28	X	N/A	N/A	X	X	X	Type 1(8mm)	7.5mm	P1_T1_10G_SFP+_25G_SFP28_10232015
P2	Single/Dual ports 40G QSFP	2x QSFP+	X	N/A	N/A	X	X	X	Type 1(8mm)	7.5mm	P2_T1_40G_QSFP+_10232015
P3	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	X	Type 1(8mm)	7.5mm	P3_T1_50G_100G_QSFP28_B_10232015
P4	Single/Dual ports 50G/100G QSFP28_A	2x SFF-8662(QSFP+ 28Gbps Style A)	X	X	N/A	X	X	X	Type 1(8mm)	7.5mm	P4_T1_50G_100G_QSFP28_A_10232015
P5	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	X	Type 2(12mm)	11.5mm	P5_T2_50G_100G_QSFP28_B_10232015
P6	Quad ports 10G/25G SFP+	1x 1x4 SFP+	X	X	N/A	X	X	X	Type 3 (8mm)	7.5mm	P6_T3_4x10G_4xSFP+_10232015
P7	Single/Dual ports 50G/100G QSFP28_B	2x SFF-8672(QSFP+ 28Gbps Style B)	X	X	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P7_T4_50G_100G_QSFP28_B_1172015
P8	Single/Dual ports 50G/100G QSFP28_A	2x SFF-8662(QSFP+ 28Gbps Style A)	X	X	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P8_T4_50G_100G_QSFP28_A_1172015
P9	Single/Dual ports 10G/25G SFP+/SFP28	2x SFP+/SFP28	X	N/A	N/A	X	X	N/A	Type 4(5mm)	7.5mm	P9_T4_10G_SFP+_25G_SFP28_1172015
	KR Mezz										
K1	4x KR Mezz in Connector A+B	1x QSFP	X	X	N/A	X	X	X	Type 2(12mm)	11.5mm	K1_T2_4x10G_QSFP+_10232015
K2	Quad SFP+ KR Mezz in Connector C	1x 1x4 SFP+	N/A	N/A	X	X	X	X	Type 1(8mm)	7.5mm	K2_T1_4x10G_4xSFP+_10232015
K3	Quad 10GBaseT KR Mezz in Connector C	1x 1x4 RJ45	N/A	N/A	X	X	X	X	Type 1(8mm)	7.5mm	K3_T1_4x10G_4xRJ45_10232015
K4	Quad SFP+ KR Mezz in Connector C	1x 1x4 SFP+	N/A	N/A	X	X	X	X	Type 2(12mm)	11.5mm	K4_T2_4x10G_4xSFP+_10232015
K5	Quad 10GBaseT KR Mezz in Connector C	1x 1x4 RJ45	N/A	N/A	X	X	X	X	Type 2(12mm)	11.5mm	K5_T2_4x10G_4xRJ45_10232015
	Max Mezz Profile										
M1	Max Mezz Profile of all Type 1		X	X	X	X	X	X	Type 1(8mm)	7.5mm	M1_T1_MAX MEZZ PROFILE_20151130
M2	Max Mezz Profile of all Type 2		X	X	X	X	X	X	Type 2(12mm)	11.5mm	M2_T2_MAX MEZZ PROFILE_20151130

NIC - System compatibility

- Request NIC vendor to fill in a checklist; template example ->

- System vendor to determine the compatibility

- Validation is still required to ensure

NIC Self check Template

Basic Info	
Mfg	
Mfg P/N	
Description	
Link	

Mechanical		
Base design	P1- Single/Dual ports 10G/25G SFP+/SFP28	
Connector A	Yes	
Connector B PCB Area	Not used	
Connector B	Not installed	
Connector C	Not installed	
Network I/O	1x SFP28	
Mezz Side Conn	Bergstak Plug 4	
Stack Type supported	Type 1	Type2

Host Interface	
Type	PCIe Gen3 x8 in Connector A

Management	
Side Band type	RMII based NC-SI
FRU Device	Yes
Mezz ID Byte	0x00 - 8 lanes of PCIe on Connector A
Mezz Capability Byte	0x00 - Single Host PCIe Mezz
Thermal Report Interface	A75,A76
Thermal Report type	Emulated

Power			
Current rating	TDC - S5	TDC - S0	Ipeak - S0
P12V_AUX/P12V	TBD	TBD	TBD
P5V_AUX	TBD	TBD	TBD
P3V3_AUX	TBD	TBD	TBD
P3V3	TBD	TBD	TBD
Special Voltage Requirement	No		
Total Card Power	TBD		

Q&A

To this update?
For implementation?
Next step?