

Simulation analysis

2025-07-16

Experiments @ [0f74d79b](#)

- Linear Leios
 - [linear.ipynb](#)
- Linear Leios with full RBs and EBs but no transactions
 - [notxs.ipynb](#)
- Linear Leios with transaction references
 - [txrefs.ipynb](#)
- Stracciatella
 - [stracciatella.ipynb](#)

sim-cli @ a9da2203

TPS

Stage length	Max EB size	Demand [tx/s]	Demand [MB/s]	Demand [Mb/s]	Time to full EB [s]	Transaction size [B/tx]
<fct>	<fct>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
5 slot/stage	0.5 MB/EB	6.976667	0.01183958	0.09471661	42.23124	1697.025
5 slot/stage	1.0 MB/EB	12.478333	0.02129649	0.17037196	46.95608	1706.678
5 slot/stage	2.0 MB/EB	28.155000	0.04781171	0.38249368	41.83076	1698.161
5 slot/stage	5.0 MB/EB	41.850000	0.07115336	0.56922689	70.27075	1700.200
8 slot/stage	0.5 MB/EB	6.976667	0.01183958	0.09471661	42.23124	1697.025
8 slot/stage	1.0 MB/EB	12.478333	0.02129649	0.17037196	46.95608	1706.678
8 slot/stage	2.0 MB/EB	28.155000	0.04781171	0.38249368	41.83076	1698.161
8 slot/stage	5.0 MB/EB	41.850000	0.07115336	0.56922689	70.27075	1700.200

Utilization

Stage length	Max EB size	Approximate RB utilization [%]	Approximate EB utilization [%]
<fct>	<fct>	<dbl>	<dbl>
5 slot/stage	0.5 MB/EB	93.51965	45.36436
5 slot/stage	1.0 MB/EB	103.13807	52.84950
5 slot/stage	2.0 MB/EB	103.87705	67.03065
5 slot/stage	5.0 MB/EB	97.05041	44.92727
8 slot/stage	0.5 MB/EB	94.82774	70.49314
8 slot/stage	1.0 MB/EB	101.83644	75.41172
8 slot/stage	2.0 MB/EB	120.36983	110.11028
8 slot/stage	5.0 MB/EB	96.51464	56.58345

Key

Linear Leios with txs references

Stracciatella

Linear Leios

Linear Leios without txs

Spatial efficiency

Stage length	Max EB size	Space efficiency [%]
<fct>	<fct>	<dbl>
5 slot/stage	0.5 MB/EB	71.37025
5 slot/stage	1.0 MB/EB	82.17250
5 slot/stage	2.0 MB/EB	87.98849
5 slot/stage	5.0 MB/EB	90.25717
8 slot/stage	0.5 MB/EB	71.98486
8 slot/stage	1.0 MB/EB	81.96673
8 slot/stage	2.0 MB/EB	86.37431
8 slot/stage	5.0 MB/EB	89.52475

Stage length	Max EB size	Space efficiency [%]
<fct>	<fct>	<dbl>
5 slot/stage	0.5 MB/EB	79.87590
5 slot/stage	1.0 MB/EB	63.16012
5 slot/stage	2.0 MB/EB	61.49854
5 slot/stage	5.0 MB/EB	64.15788
8 slot/stage	0.5 MB/EB	56.79223
8 slot/stage	1.0 MB/EB	46.42267
8 slot/stage	2.0 MB/EB	43.53820
8 slot/stage	5.0 MB/EB	51.35062

Stage length	Max EB size	Space efficiency [%]
<fct>	<fct>	<dbl>
5 slot/stage	0.5 MB/EB	64.13165
5 slot/stage	1.0 MB/EB	74.57606
5 slot/stage	2.0 MB/EB	85.38662
5 slot/stage	5.0 MB/EB	88.69461
8 slot/stage	0.5 MB/EB	72.36576
8 slot/stage	1.0 MB/EB	81.66809
8 slot/stage	2.0 MB/EB	89.55633
8 slot/stage	5.0 MB/EB	91.91031

Temporal efficiency

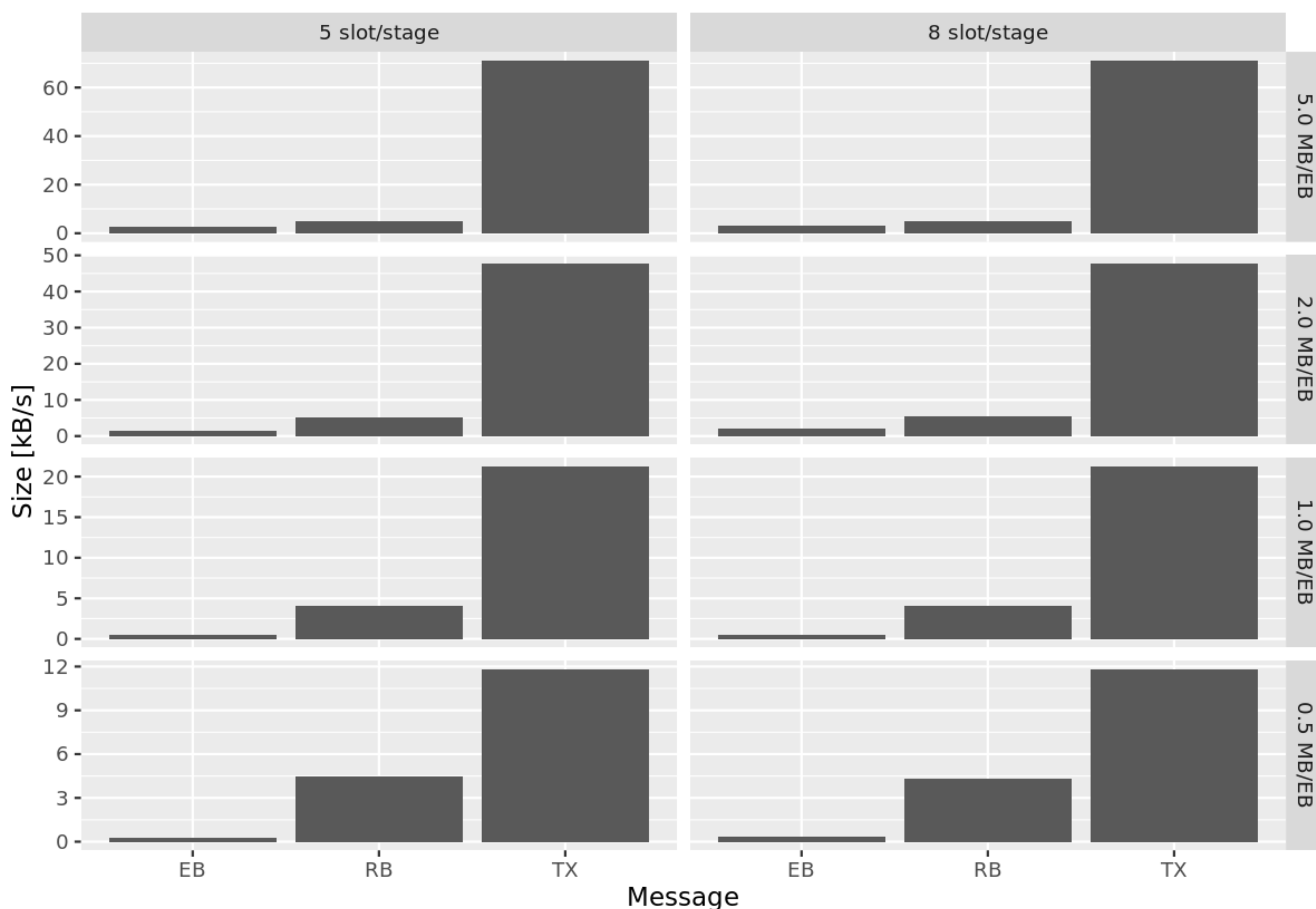
Stage length	Max EB size	Time to reach EB [s]
<fct>	<fct>	<dbl>
5 slot/stage	0.5 MB/EB	20.30026
5 slot/stage	1.0 MB/EB	19.45941
5 slot/stage	2.0 MB/EB	20.29574
5 slot/stage	5.0 MB/EB	21.56344
8 slot/stage	0.5 MB/EB	20.63884
8 slot/stage	1.0 MB/EB	19.17753
8 slot/stage	2.0 MB/EB	49.64374
8 slot/stage	5.0 MB/EB	24.58151

Stage length	Max EB size	Time to reach EB [s]
<fct>	<fct>	<dbl>
5 slot/stage	0.5 MB/EB	24.07720
5 slot/stage	1.0 MB/EB	18.90843
5 slot/stage	2.0 MB/EB	20.25911
5 slot/stage	5.0 MB/EB	22.93963
8 slot/stage	0.5 MB/EB	30.81804
8 slot/stage	1.0 MB/EB	26.57588
8 slot/stage	2.0 MB/EB	57.42223
8 slot/stage	5.0 MB/EB	23.01206

Stage length	Max EB size	Time to reach EB [s]
<fct>	<fct>	<dbl>
5 slot/stage	0.5 MB/EB	5.870323
5 slot/stage	1.0 MB/EB	5.846619
5 slot/stage	2.0 MB/EB	5.846295
5 slot/stage	5.0 MB/EB	5.821703
8 slot/stage	0.5 MB/EB	9.320229
8 slot/stage	1.0 MB/EB	9.779036
8 slot/stage	2.0 MB/EB	10.036648
8 slot/stage	5.0 MB/EB	9.902443

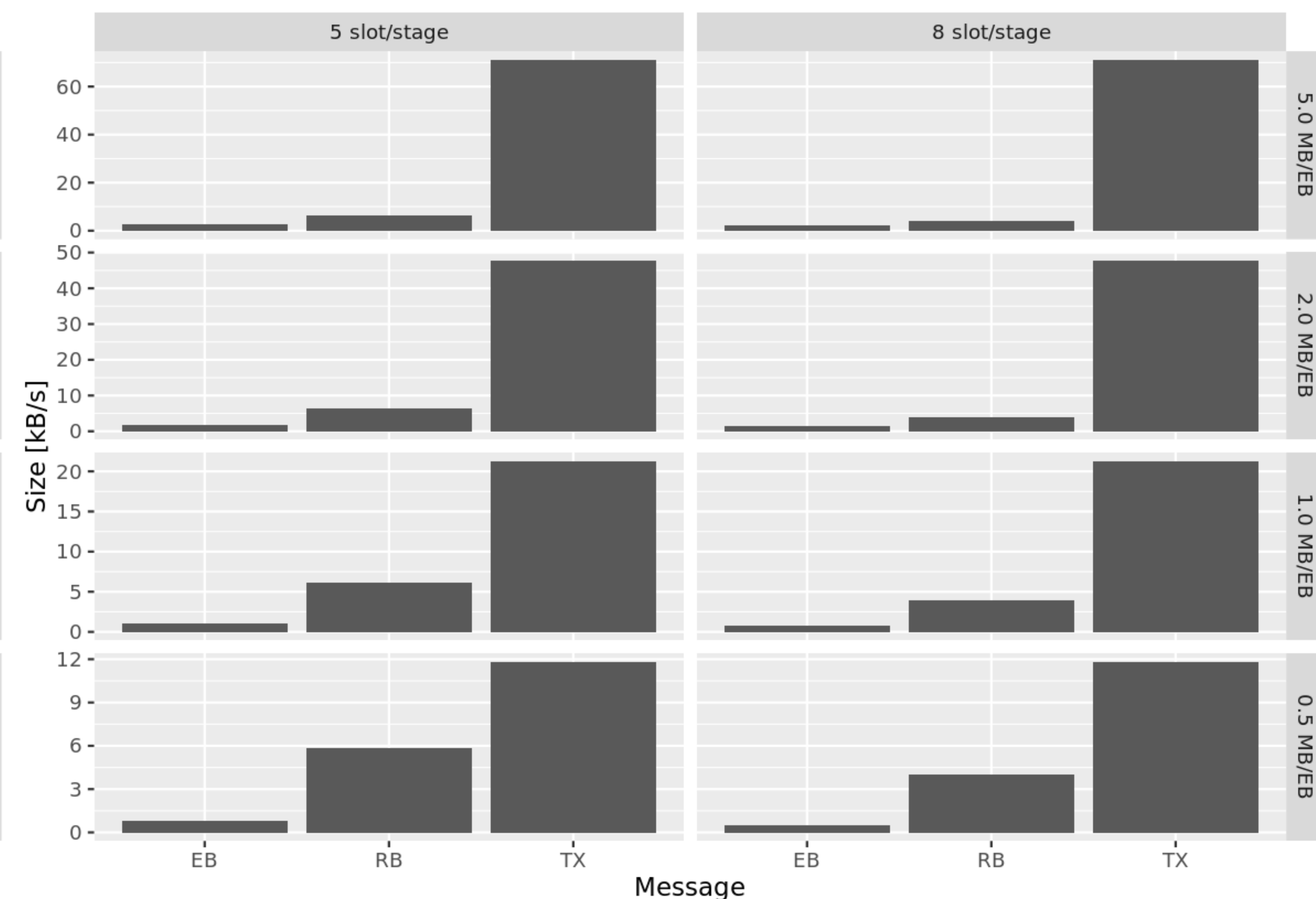
Size of diffused data

Rust simulator, mini-mainnet, linear-with-tx-references



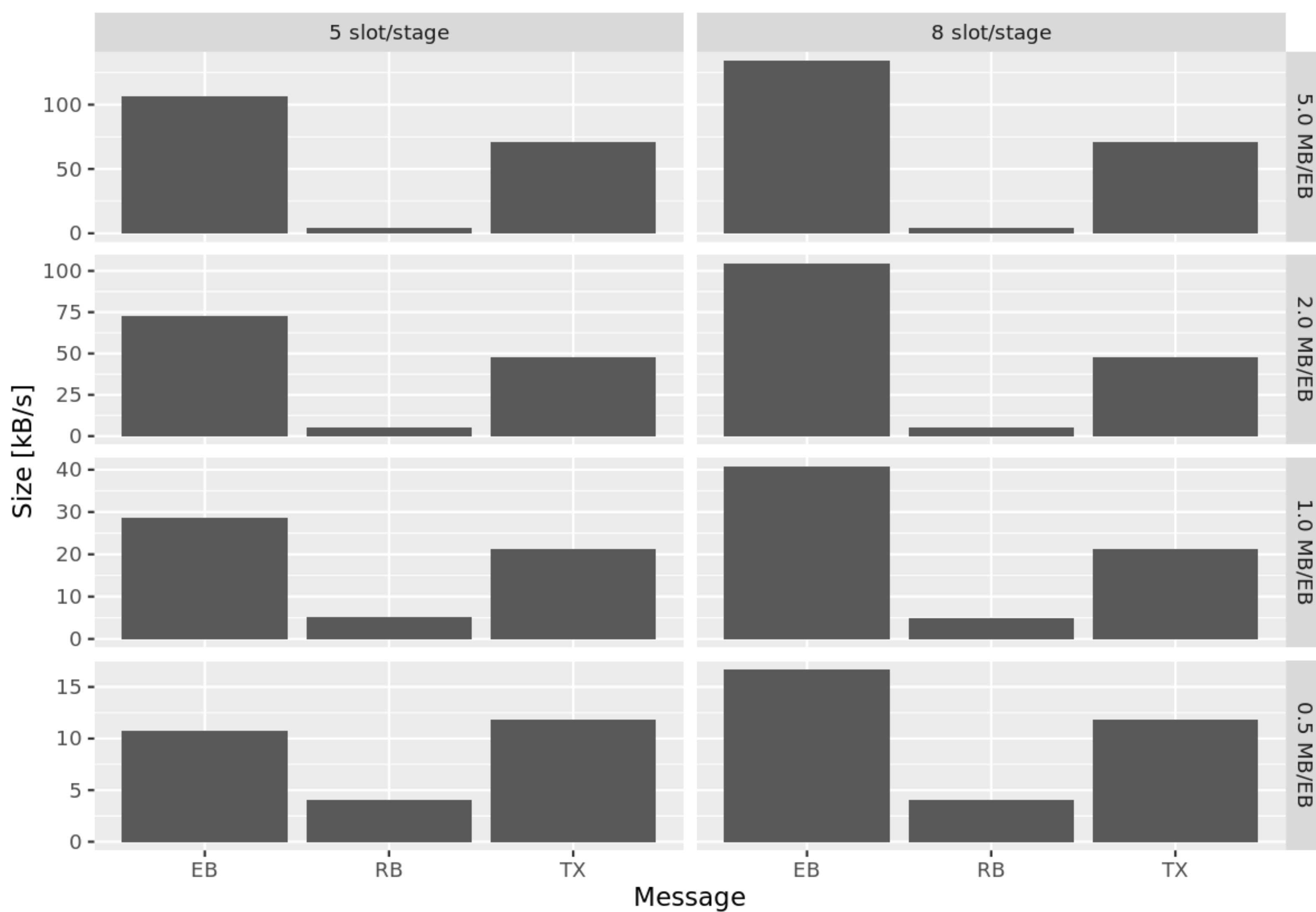
Size of diffused data

Rust simulator, mini-mainnet, full-without-ibs



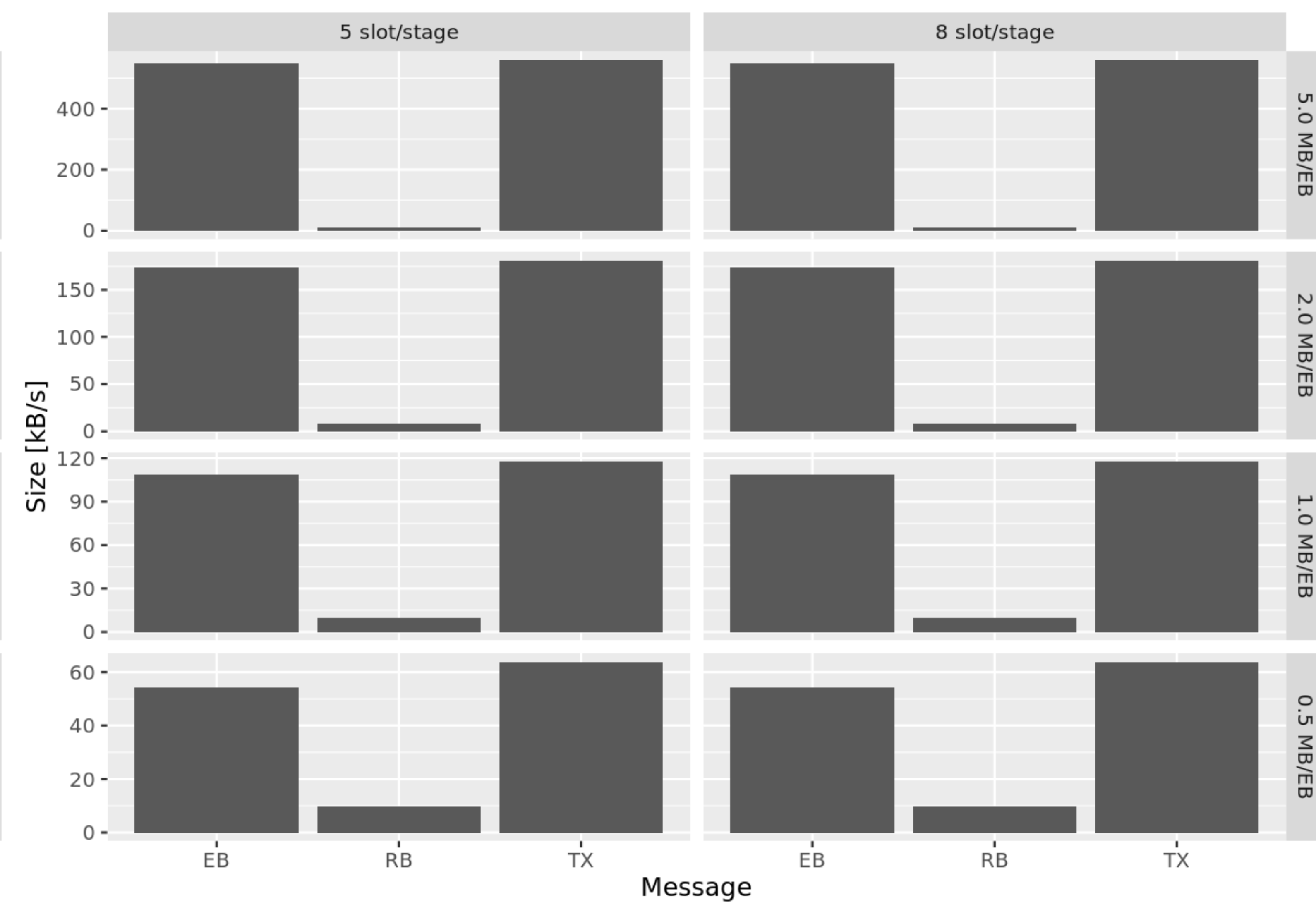
Size of diffused data

Rust simulator, mini-mainnet, linear



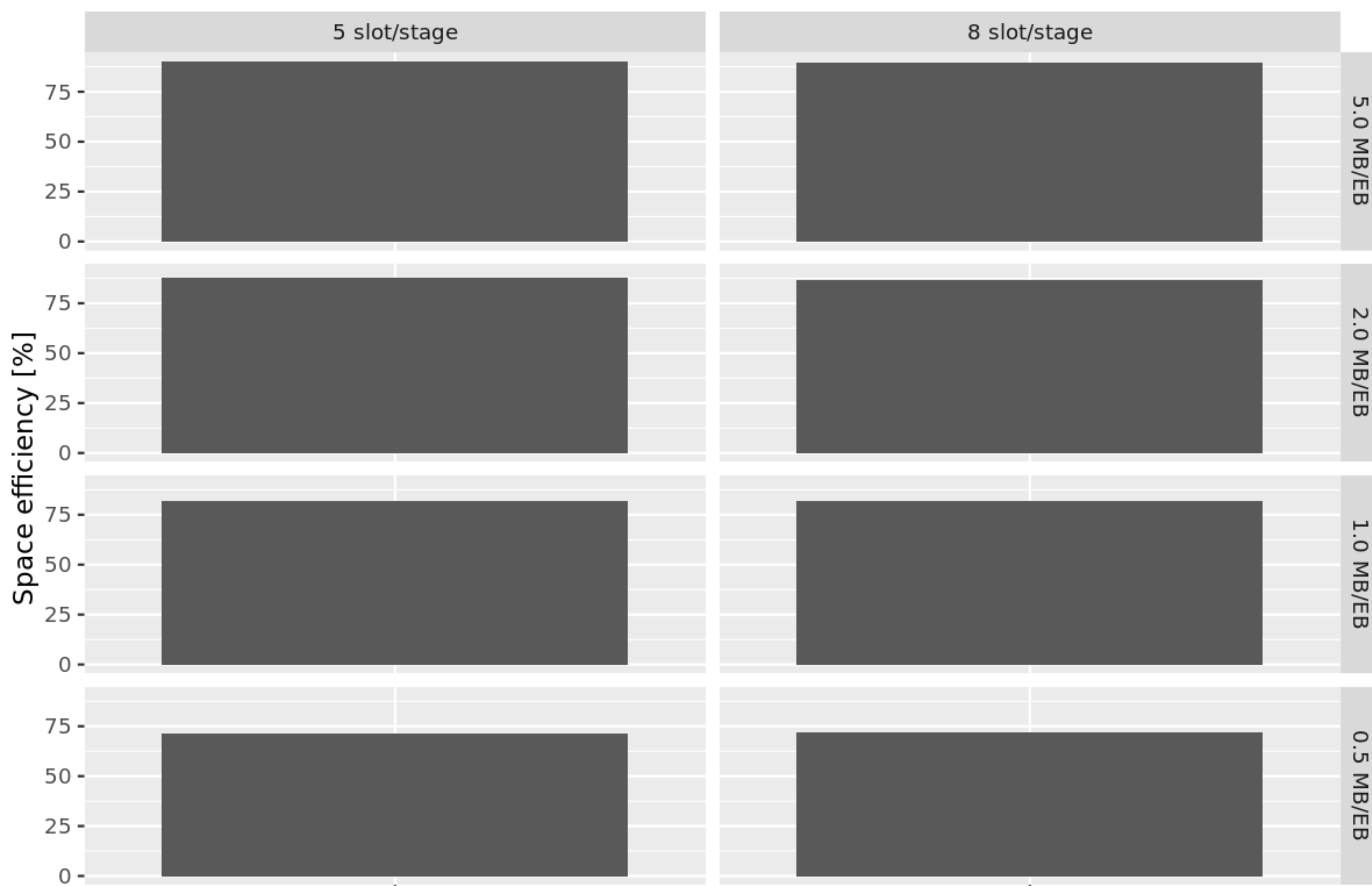
Size of diffused data

Rust simulator, mini-mainnet, linear, no txs



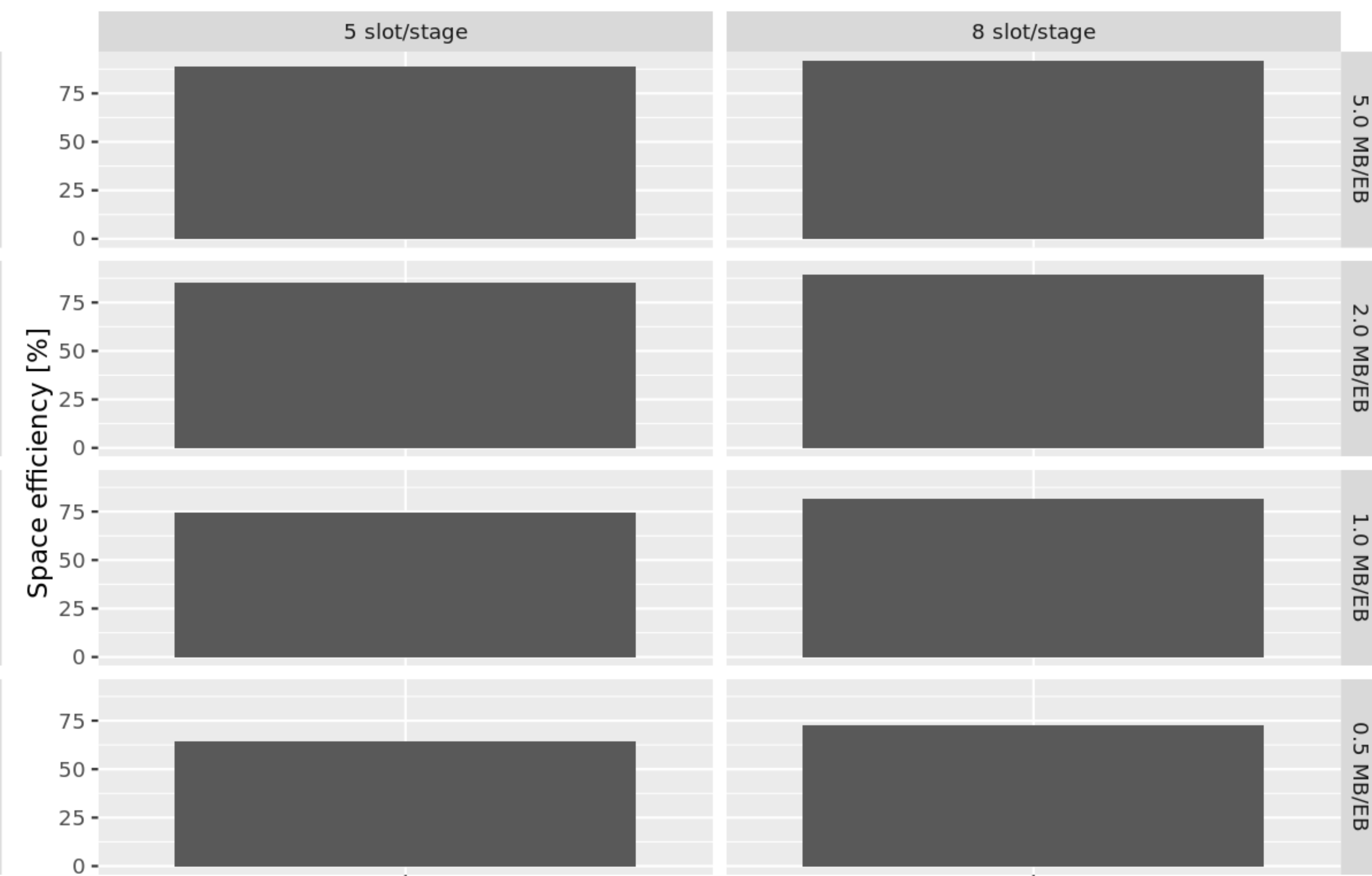
Spatial efficiency (size of txs on ledger / size of non-tx persisted data)

Rust simulator, mini-mainnet, linear-with-tx-references



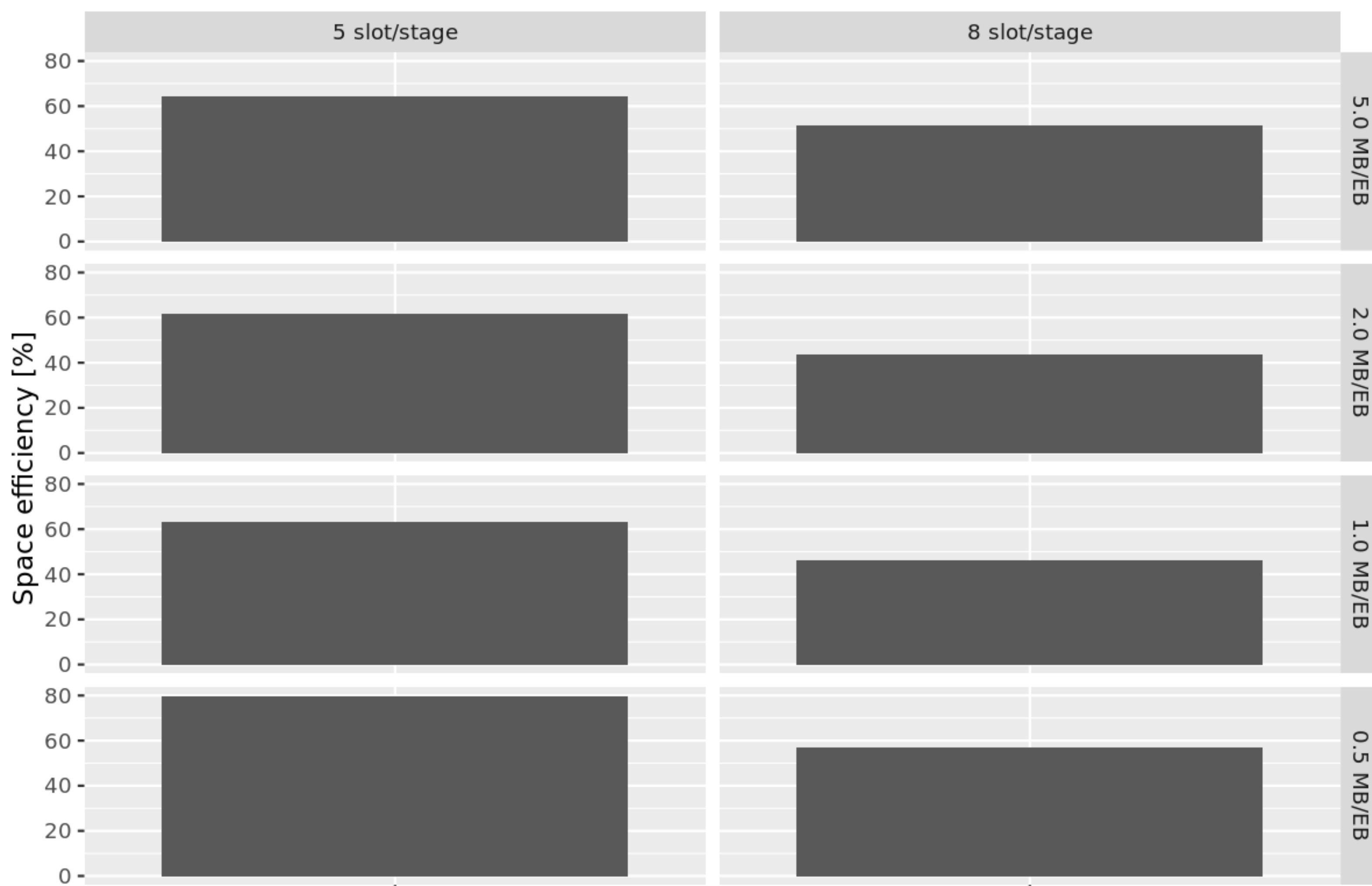
Spatial efficiency (size of txs on ledger / size of non-tx persisted data)

Rust simulator, mini-mainnet, full-without-ibs



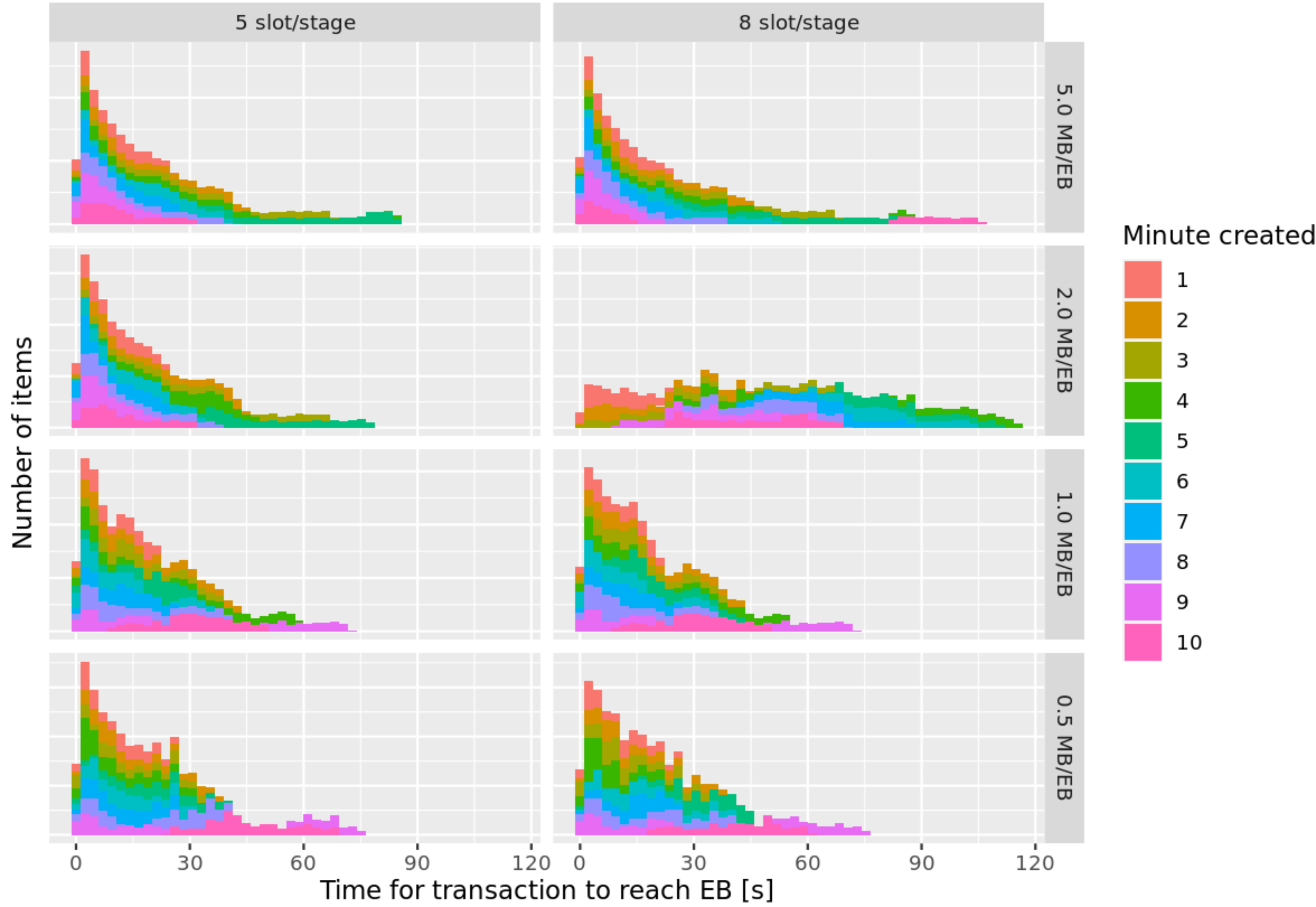
Spatial efficiency (size of txs on ledger / size of non-tx persisted data)

Rust simulator, mini-mainnet, linear



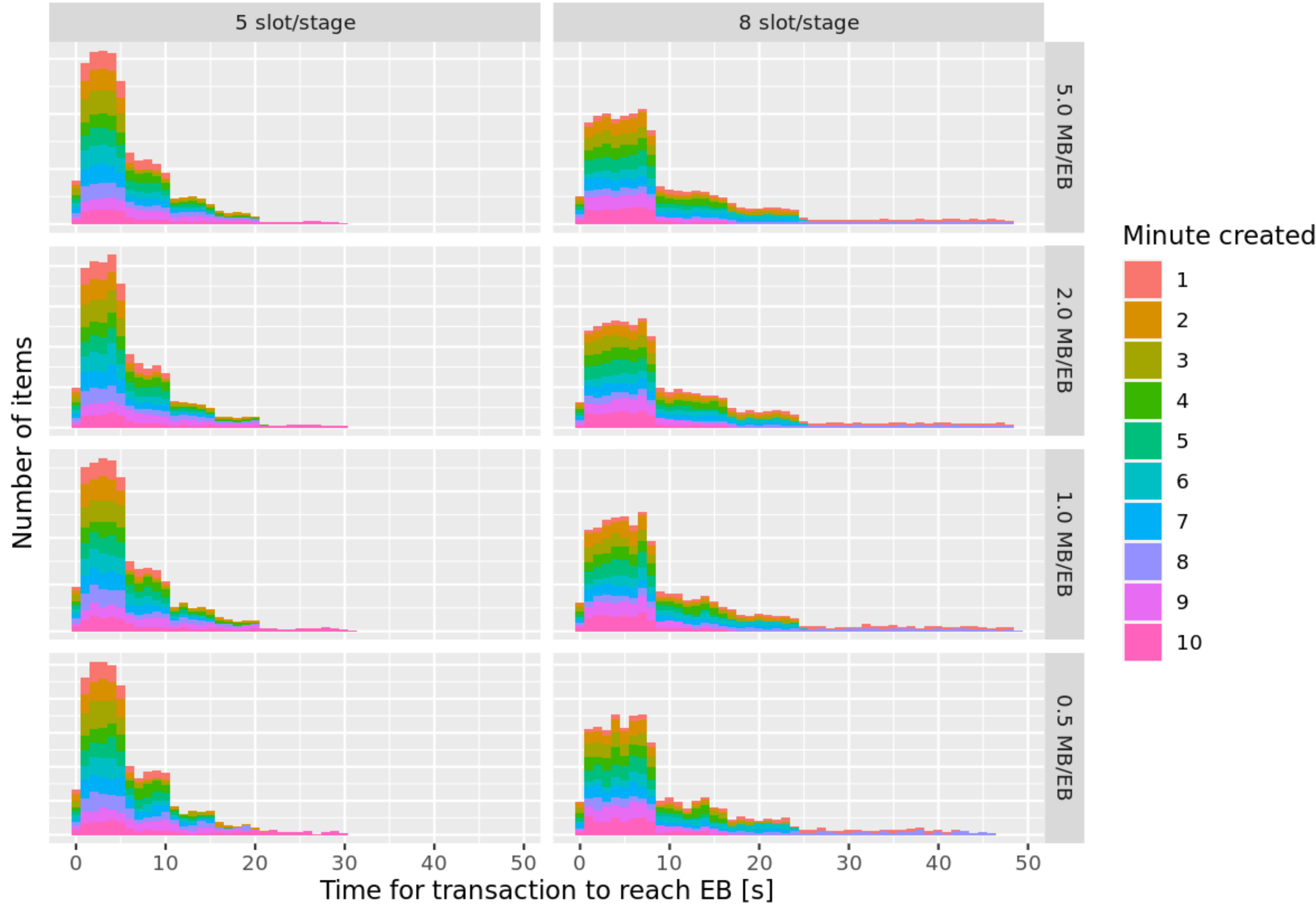
Time for transaction to reach an EB

Rust simulator, mini-mainnet, linear-with-tx-references



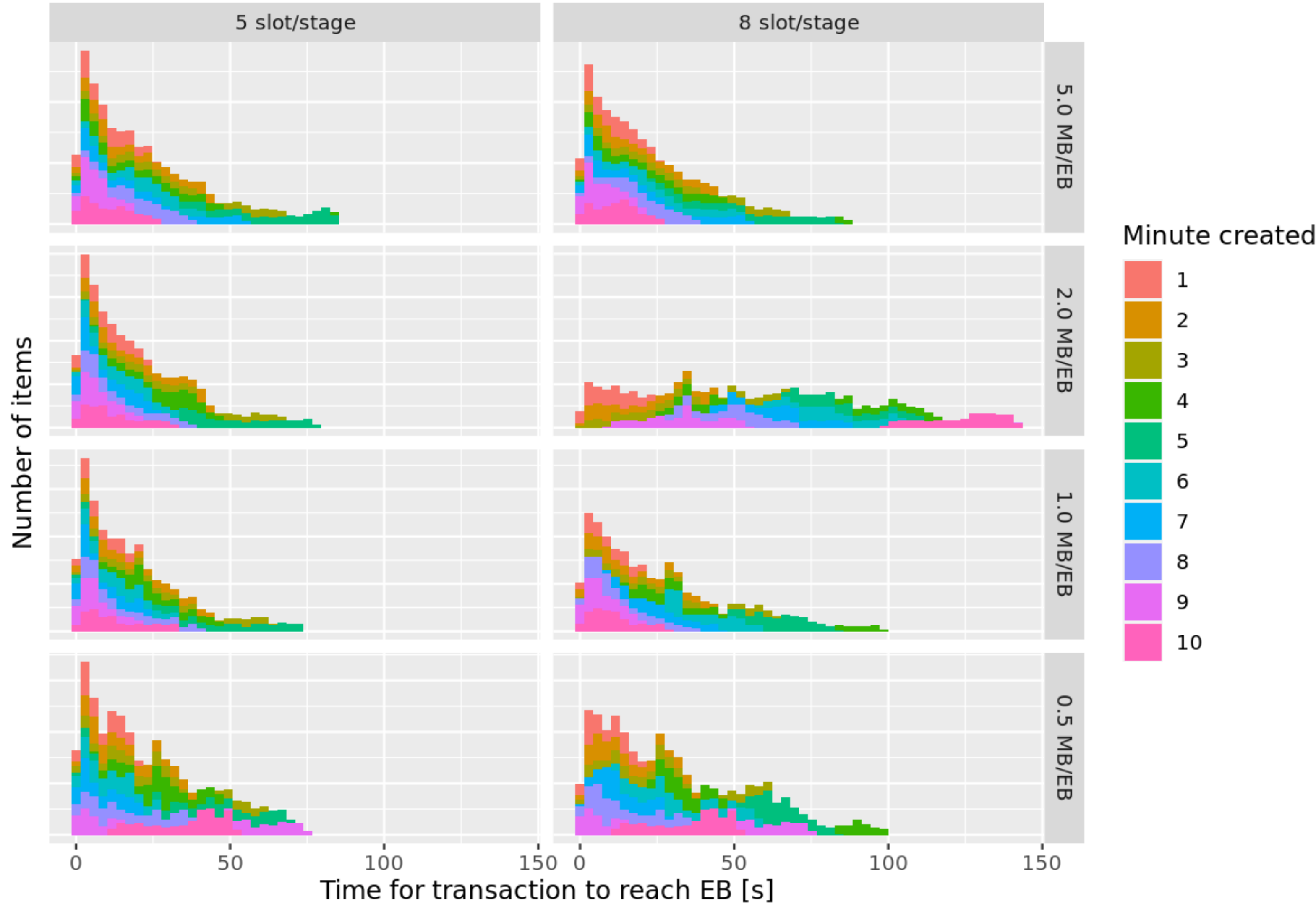
Time for transaction to reach an EB

Rust simulator, mini-mainnet, full-without-ibs



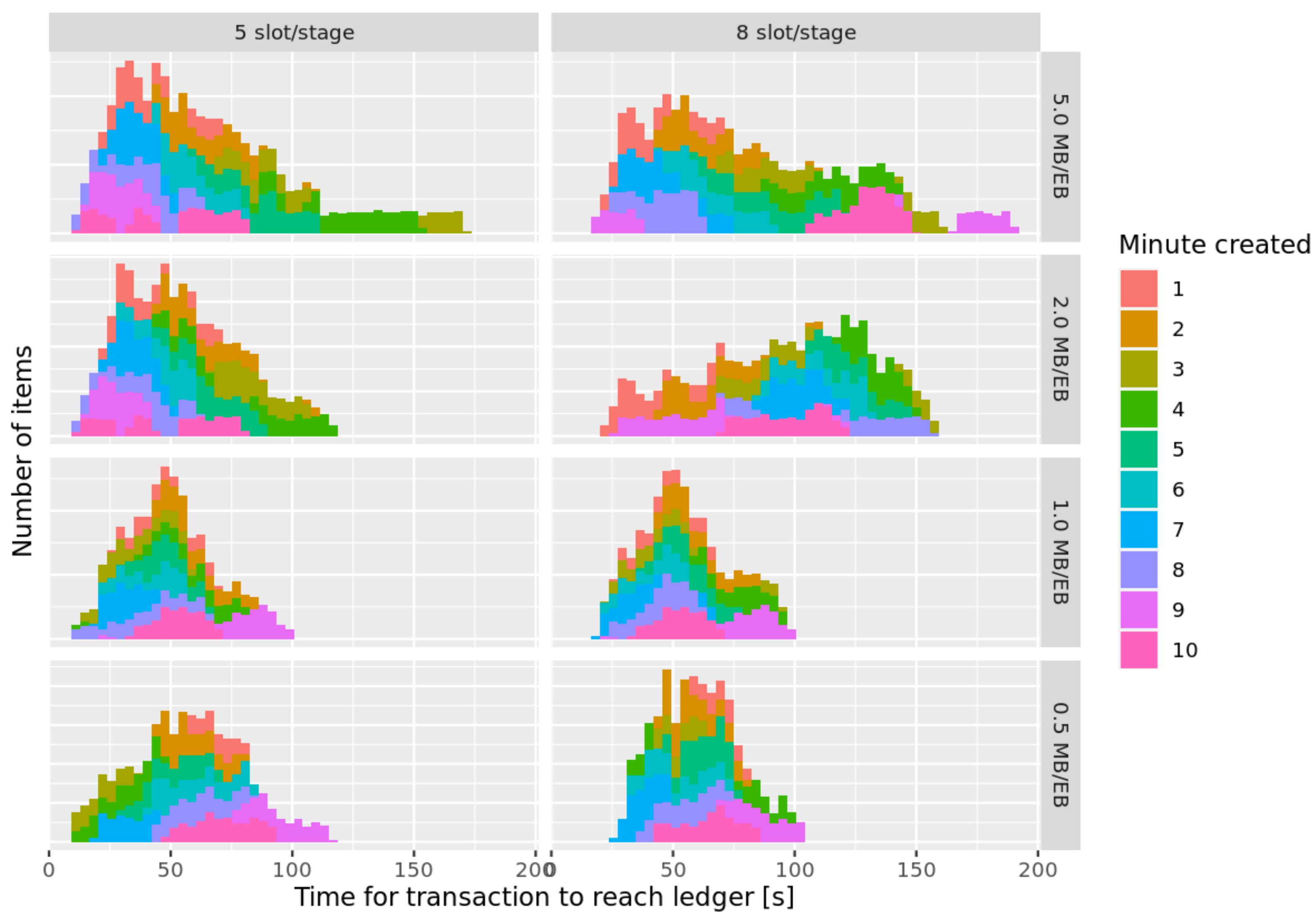
Time for transaction to reach an EB

Rust simulator, mini-mainnet, linear



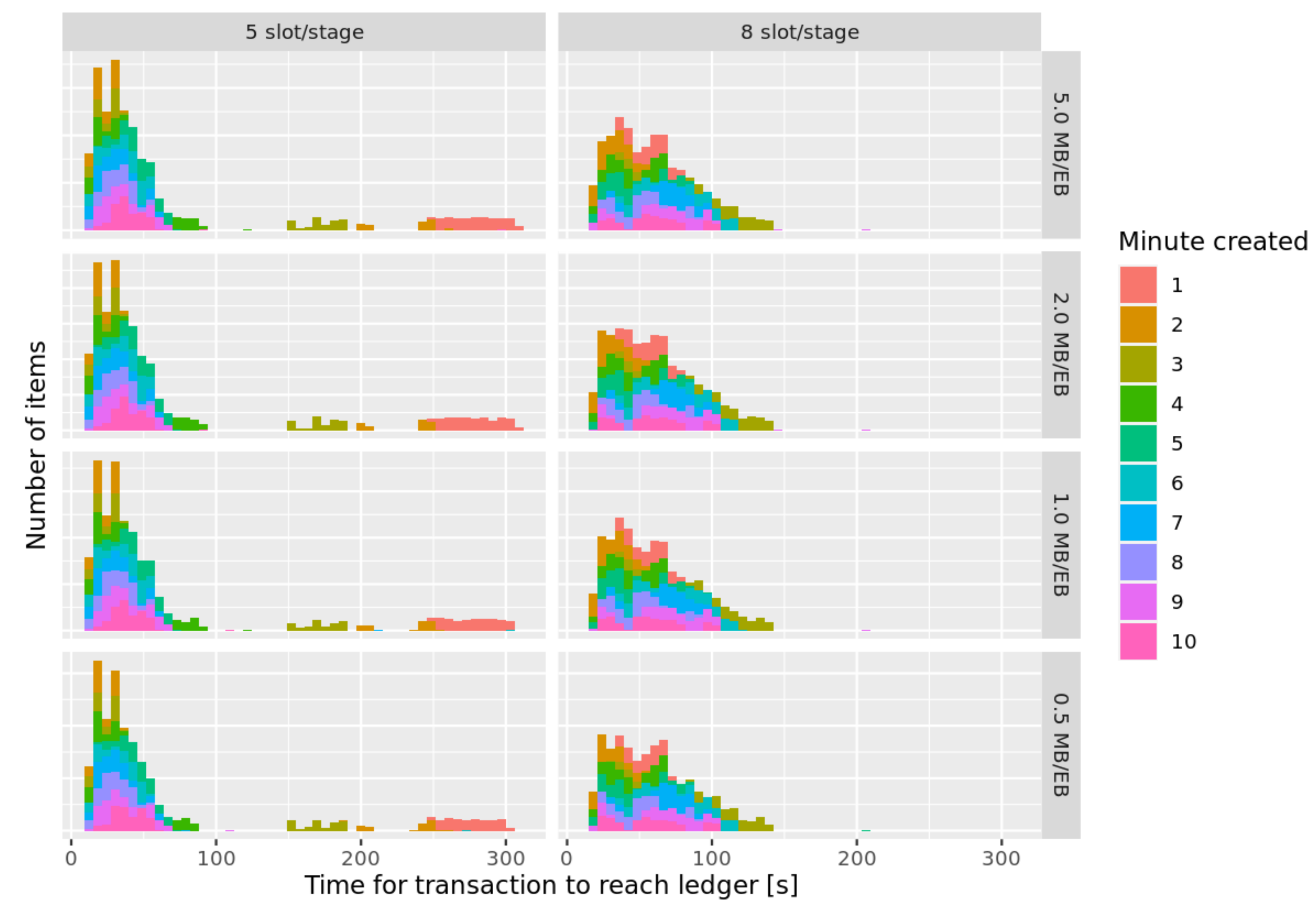
Time for transaction to reach the ledger

Rust simulator, mini-mainnet, linear-with-tx-references



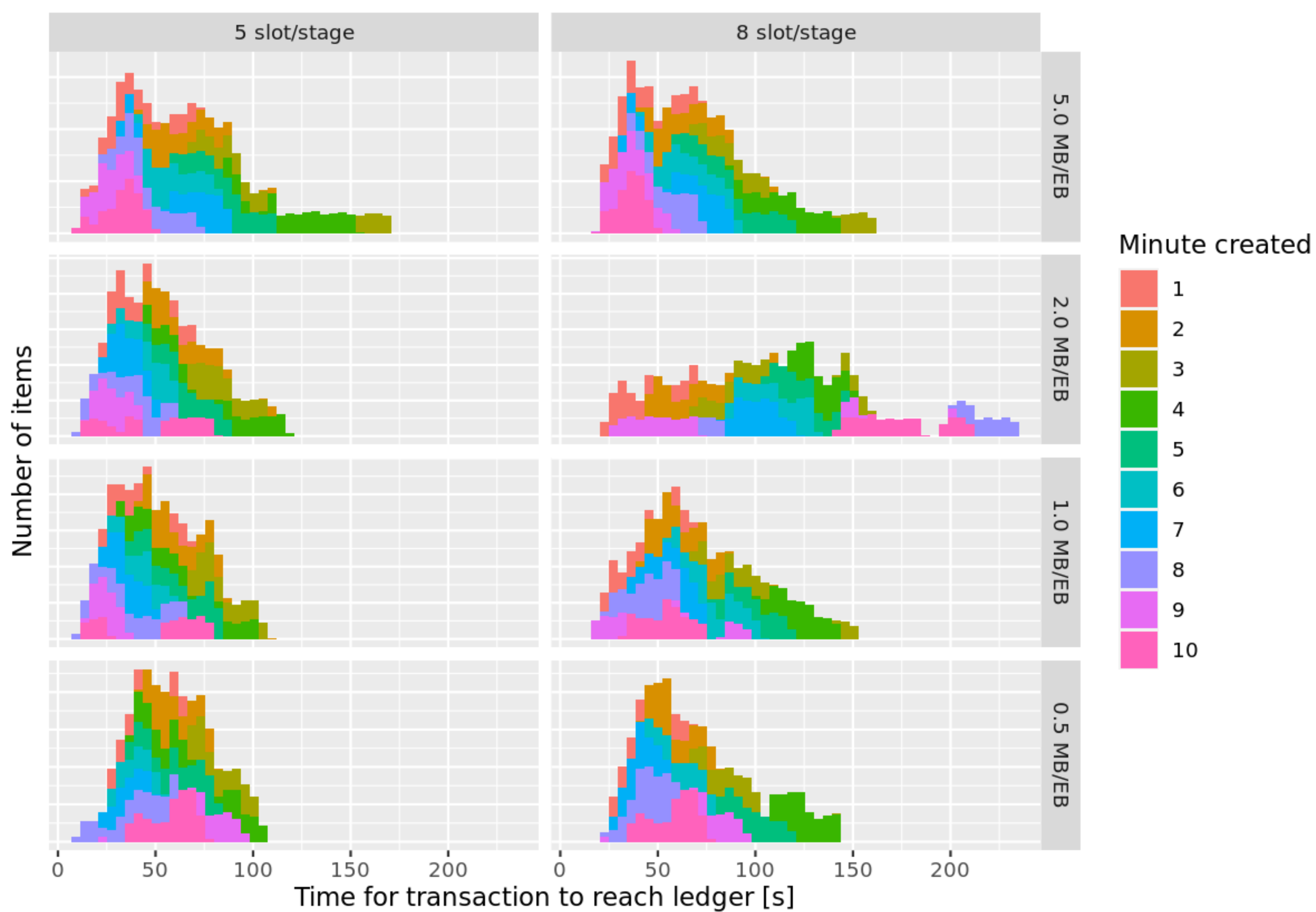
Time for transaction to reach the ledger

Rust simulator, mini-mainnet, full-without-ibs



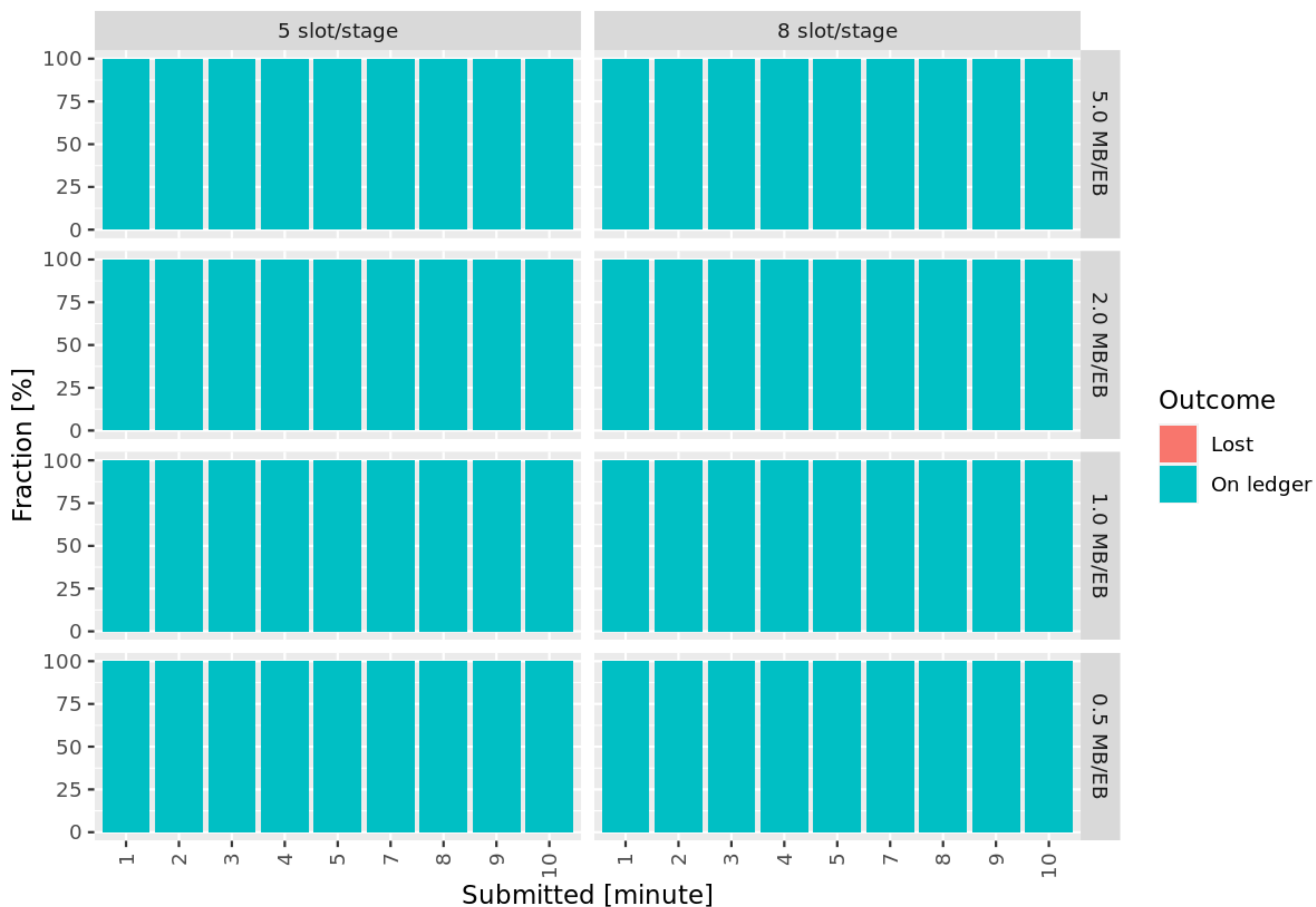
Time for transaction to reach the ledger

Rust simulator, mini-mainnet, linear



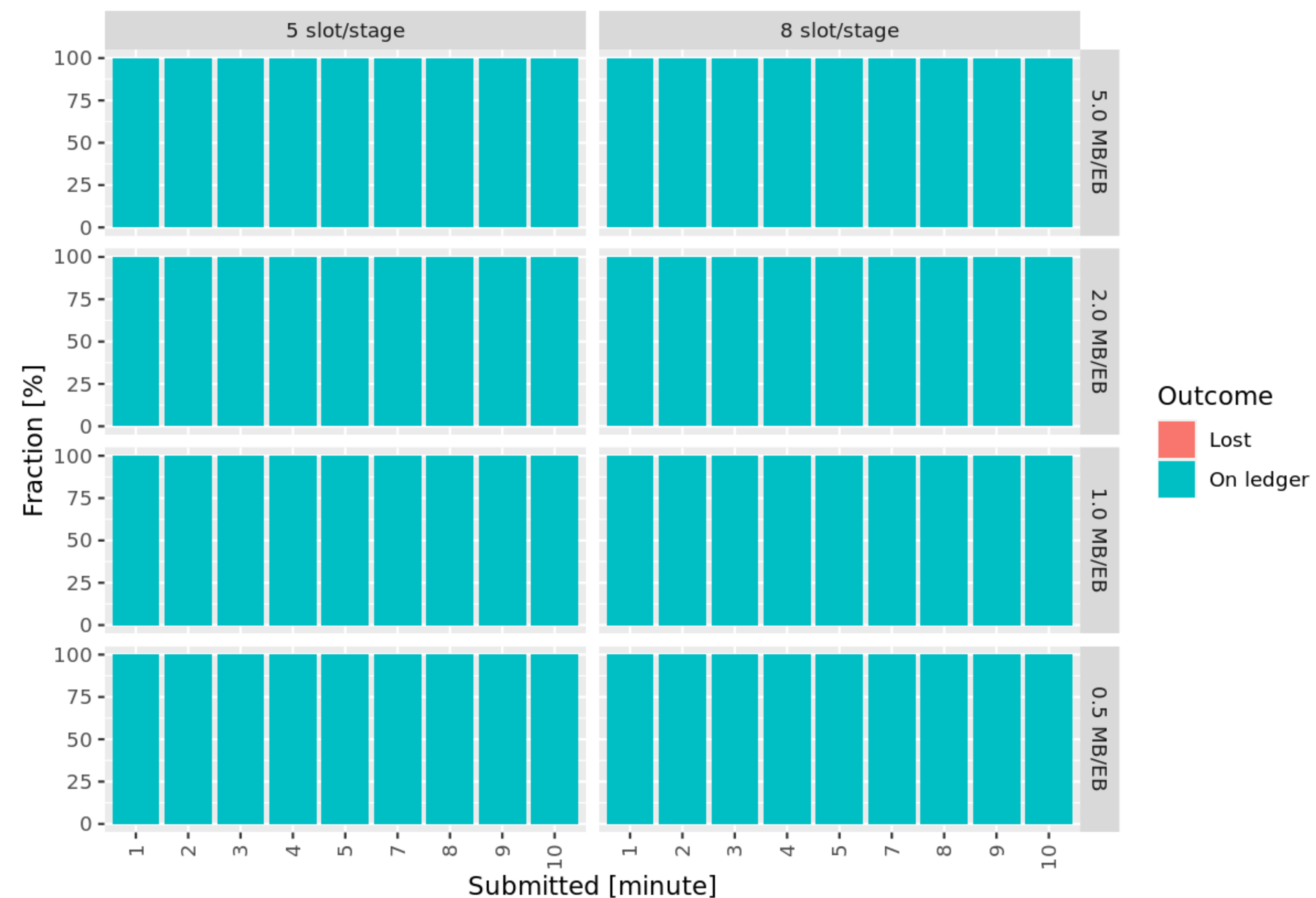
Transactions reaching the ledger

Rust simulator, mini-mainnet, linear-with-tx-references



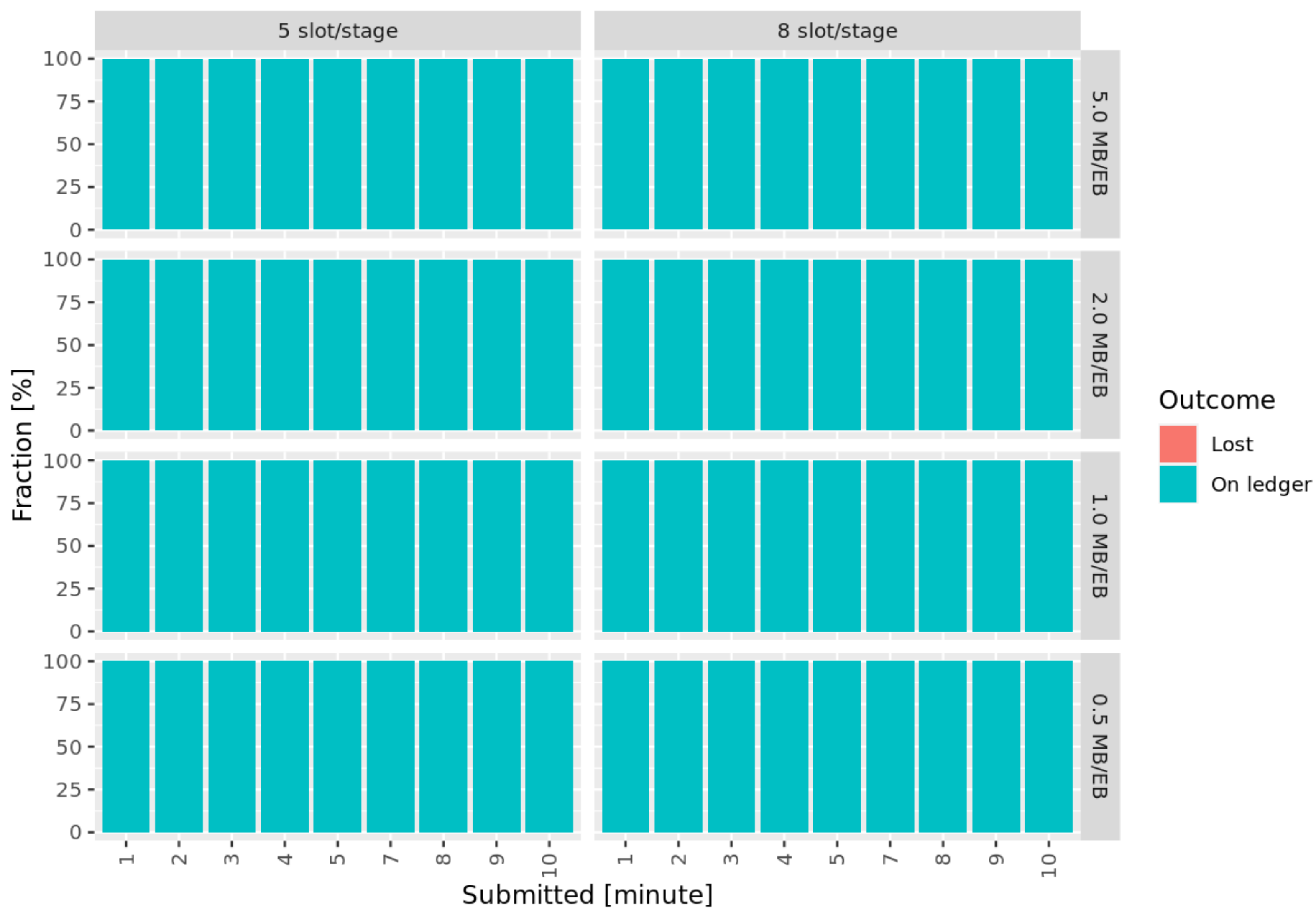
Transactions reaching the ledger

Rust simulator, mini-mainnet, full-without-ibs



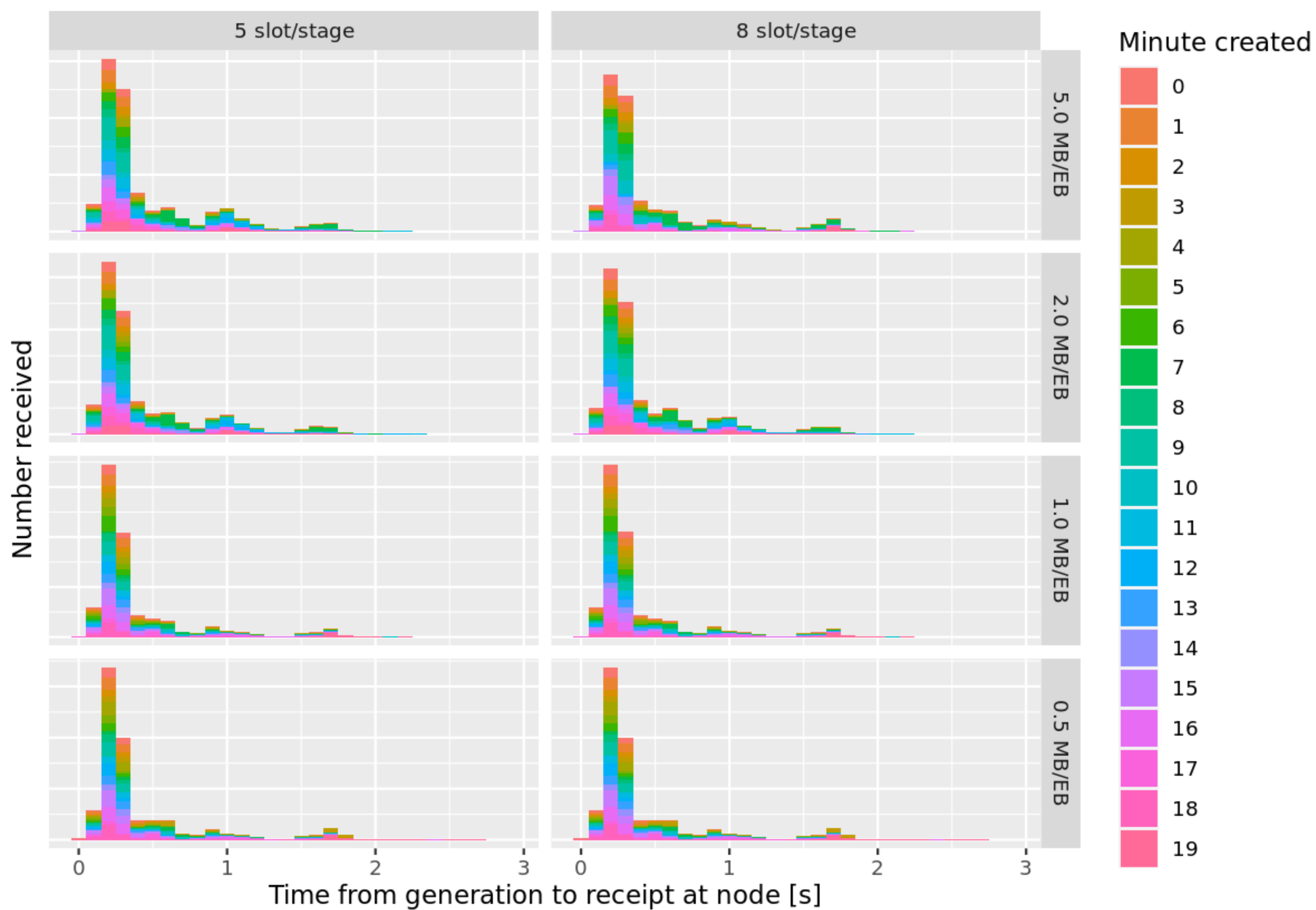
Transactions reaching the ledger

Rust simulator, mini-mainnet, linear



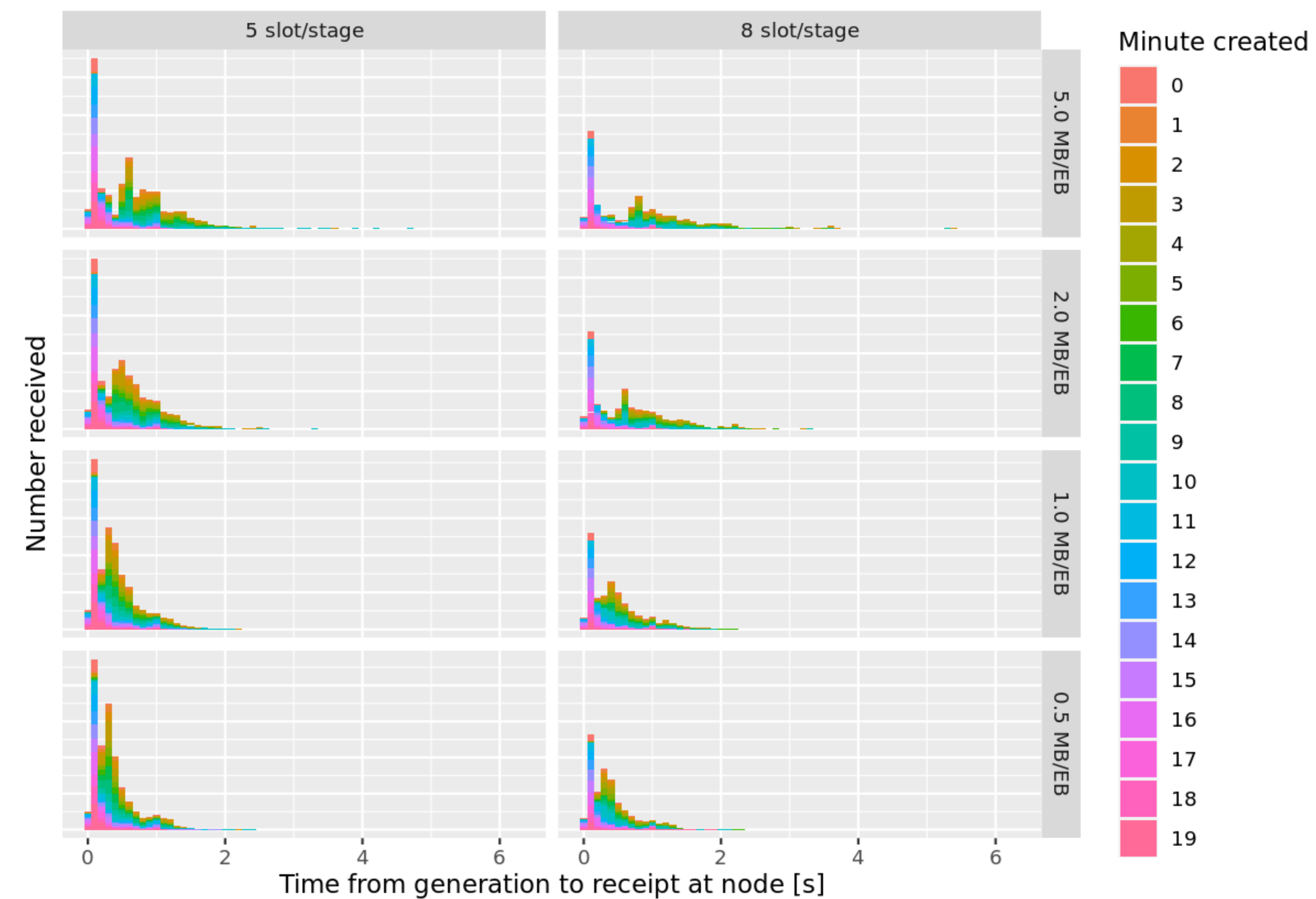
Arrival delay for EB

Rust simulator, mini-mainnet, linear-with-tx-references



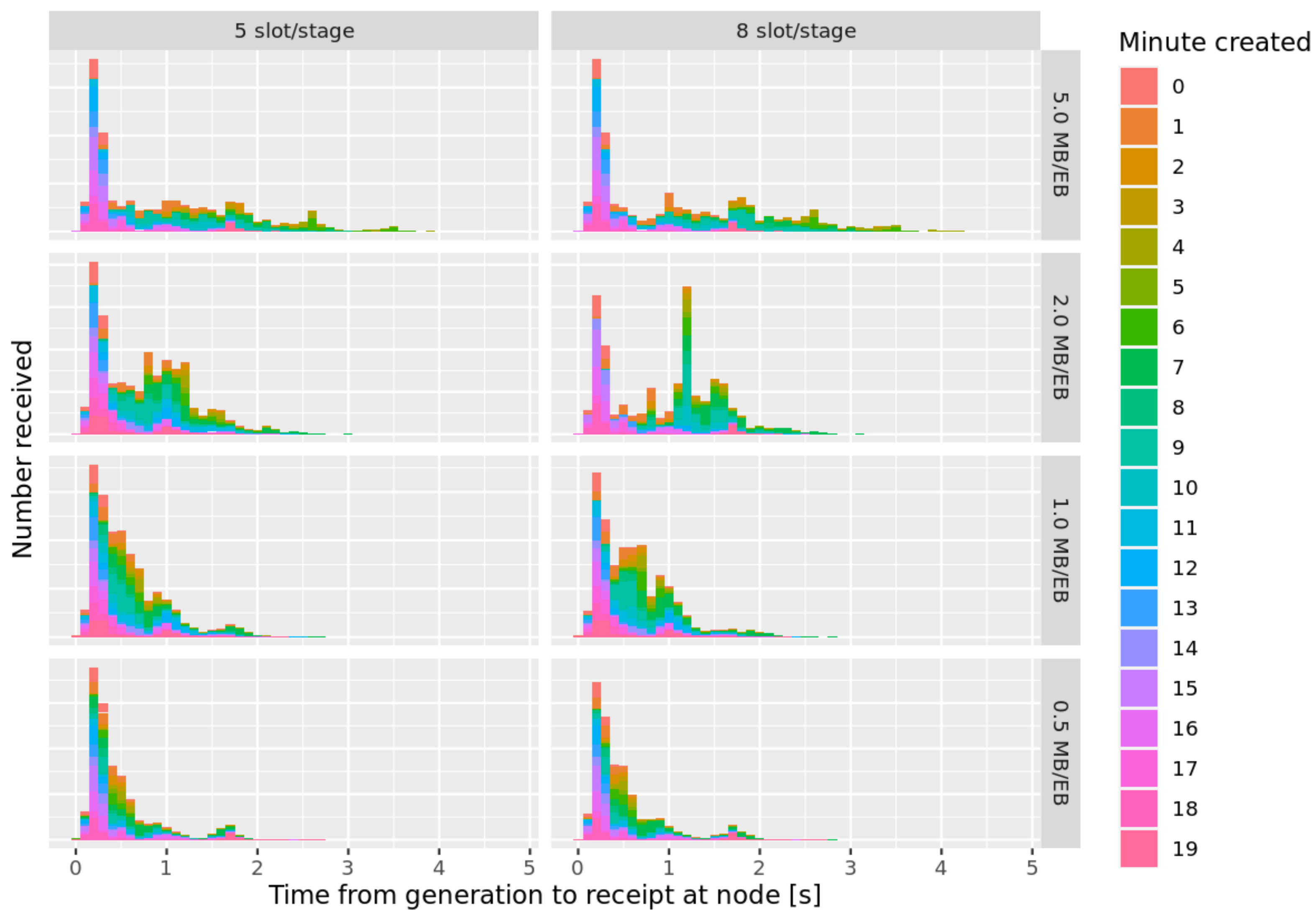
Arrival delay for EB

Rust simulator, mini-mainnet, full-without-ibs



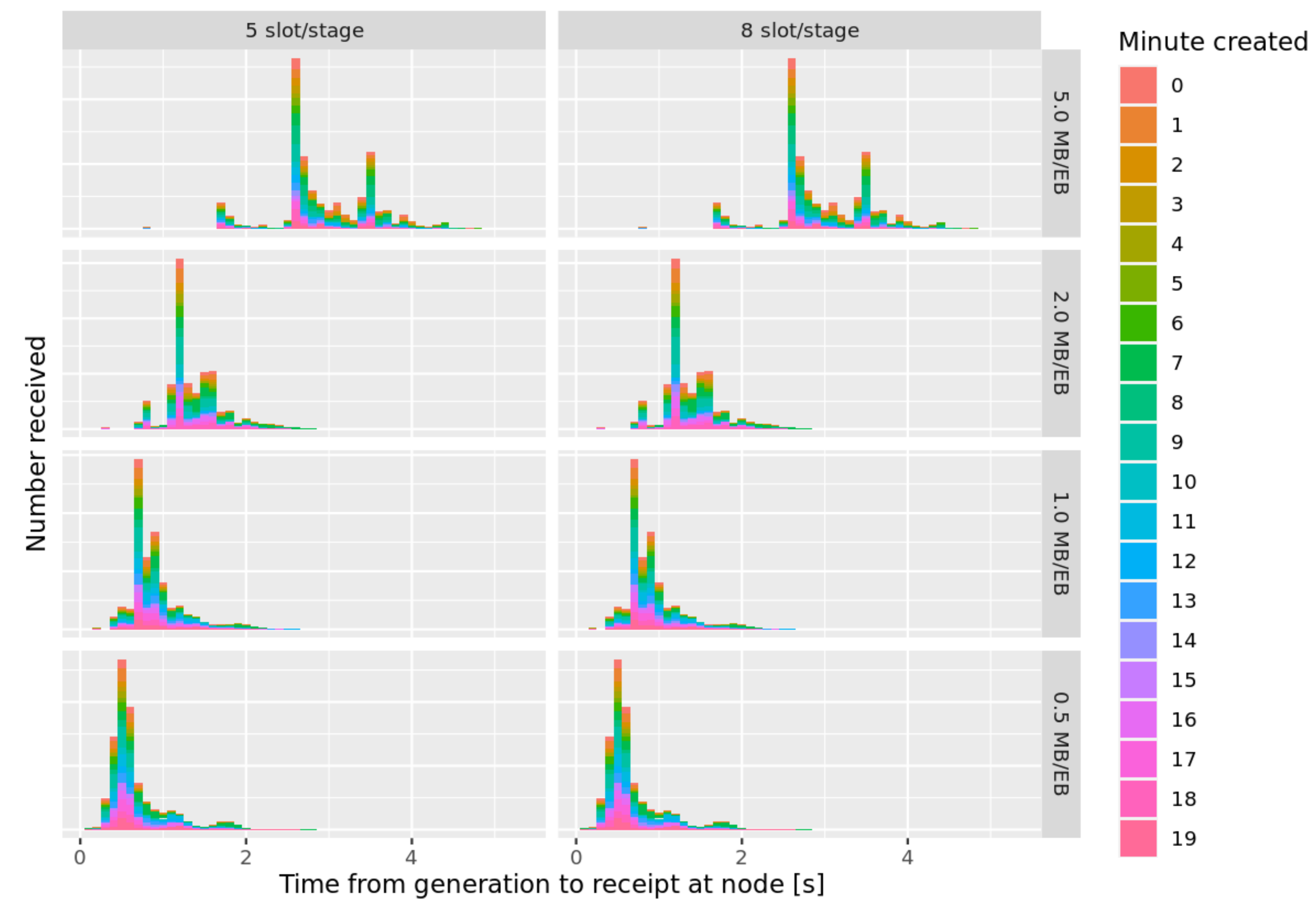
Arrival delay for EB

Rust simulator, mini-mainnet, linear



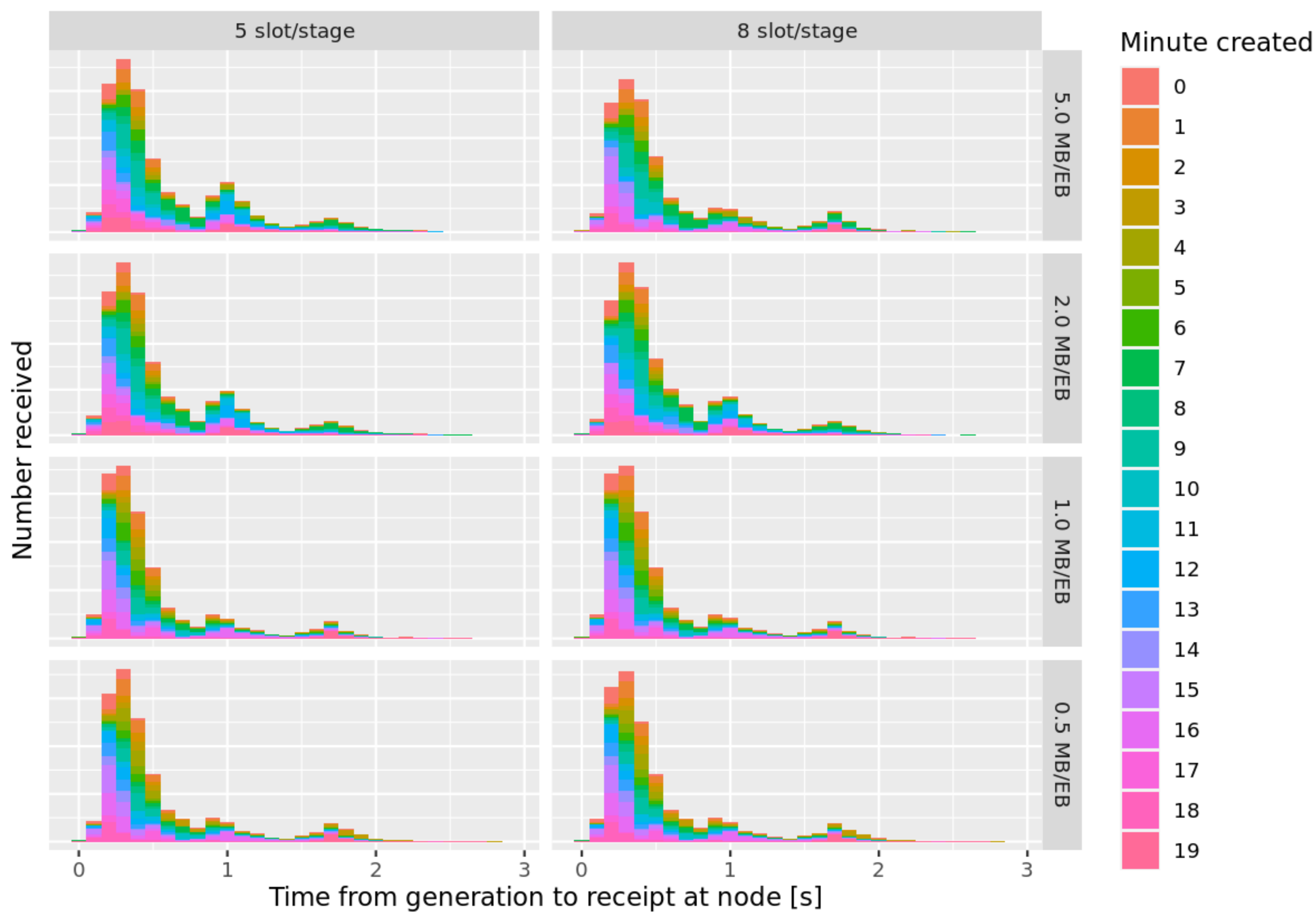
Arrival delay for EB

Rust simulator, mini-mainnet, linear, no txs



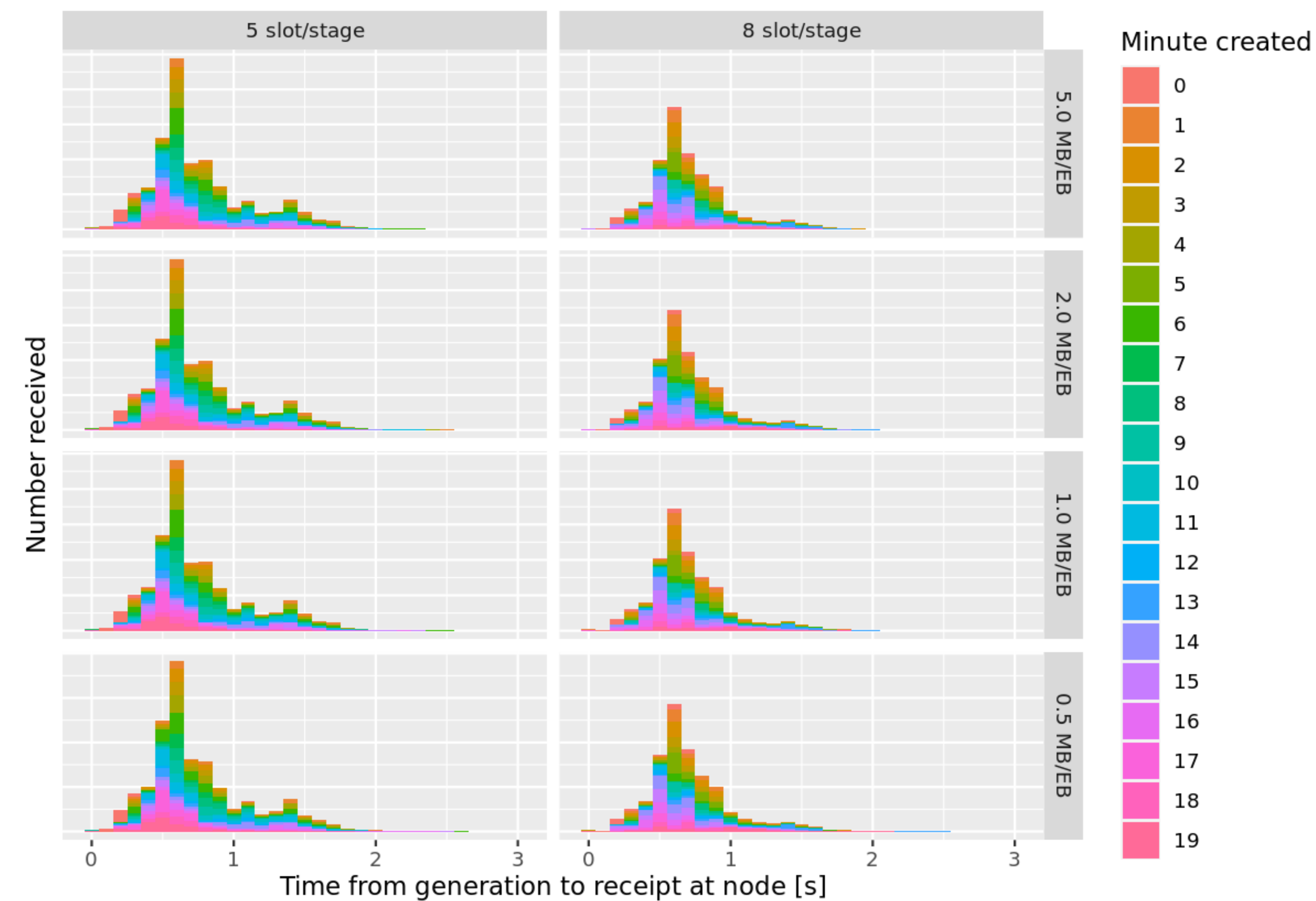
Arrival delay for RB

Rust simulator, mini-mainnet, linear-with-tx-references



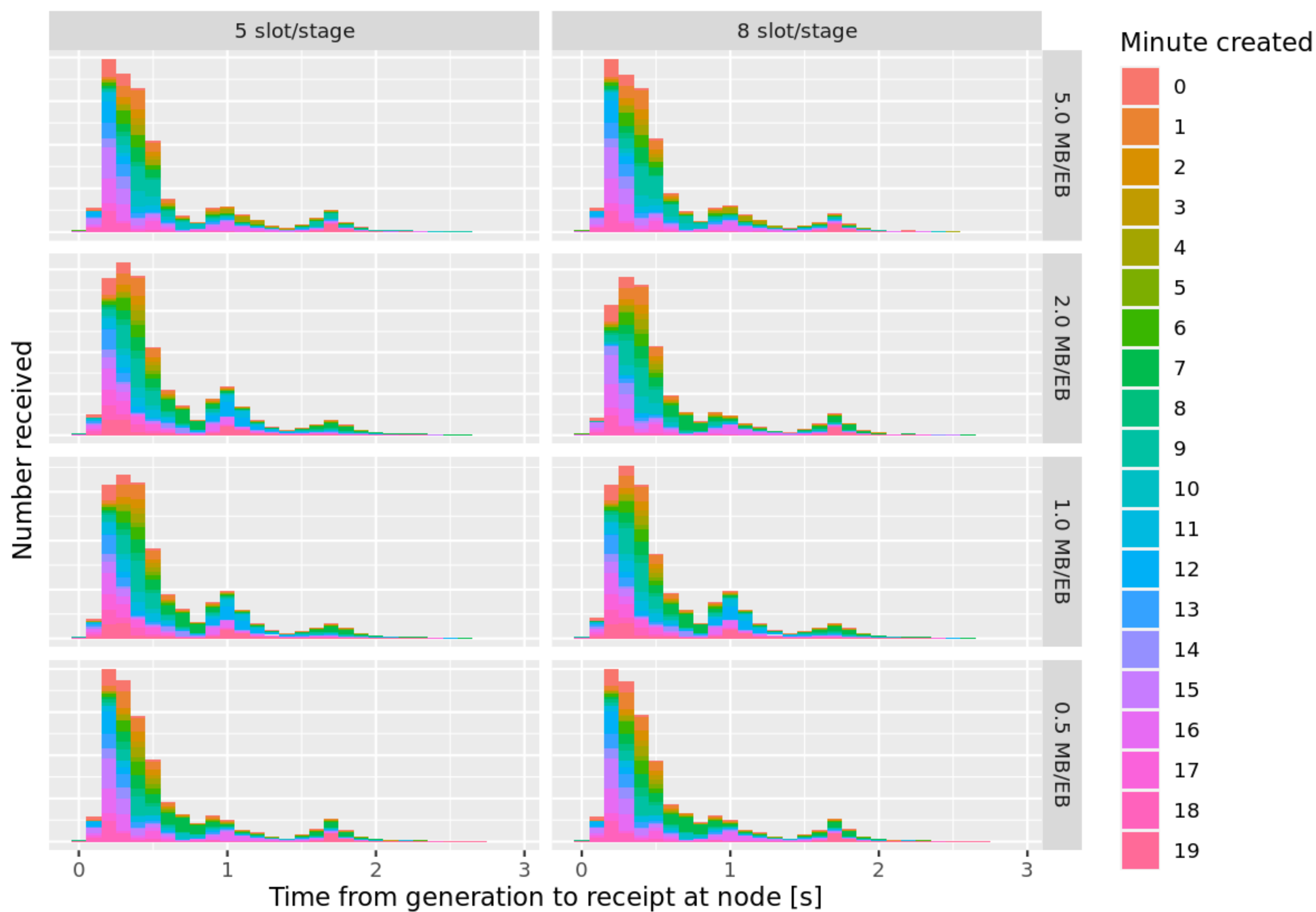
Arrival delay for RB

Rust simulator, mini-mainnet, full-without-ibs



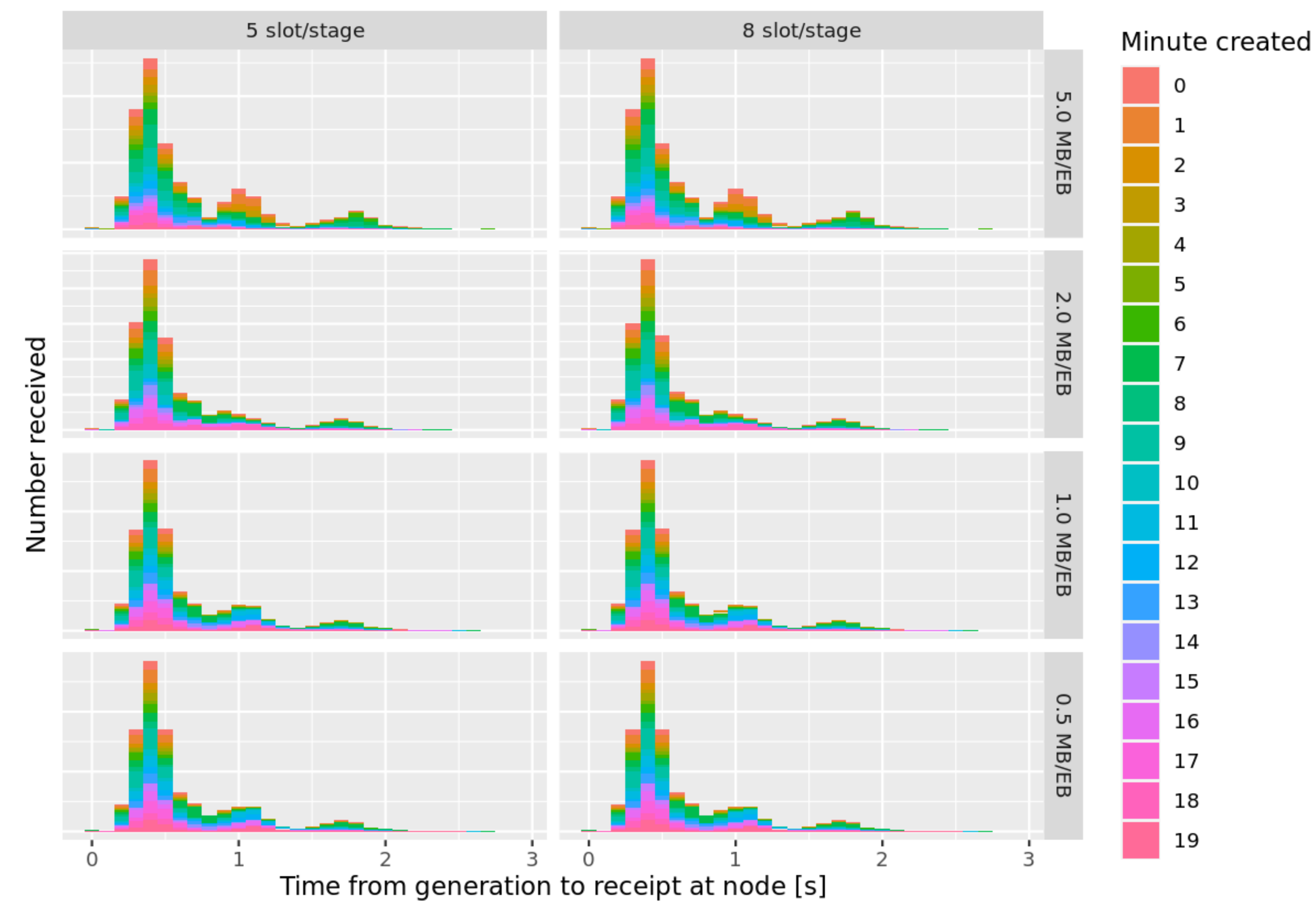
Arrival delay for RB

Rust simulator, mini-mainnet, linear

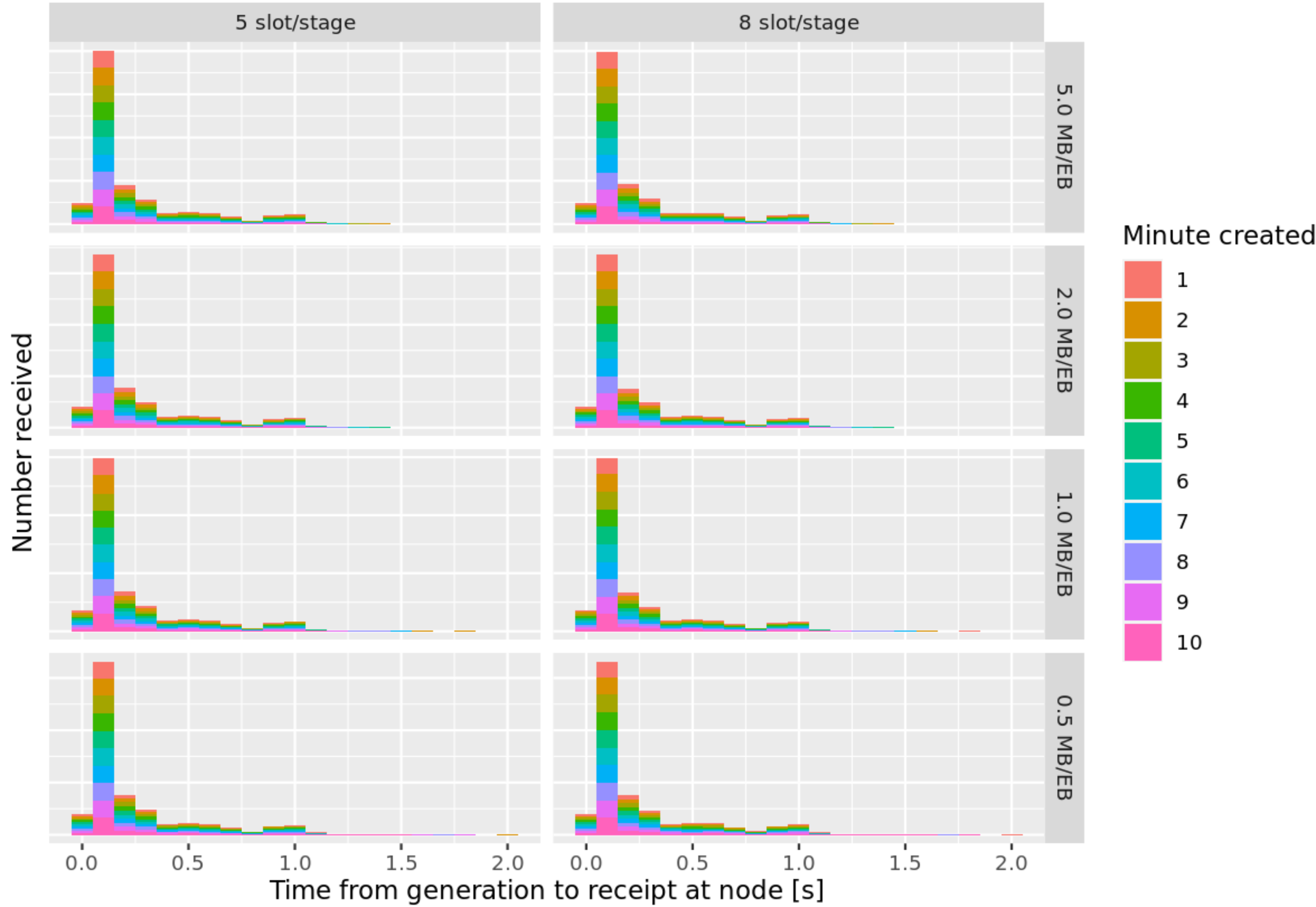


Arrival delay for RB

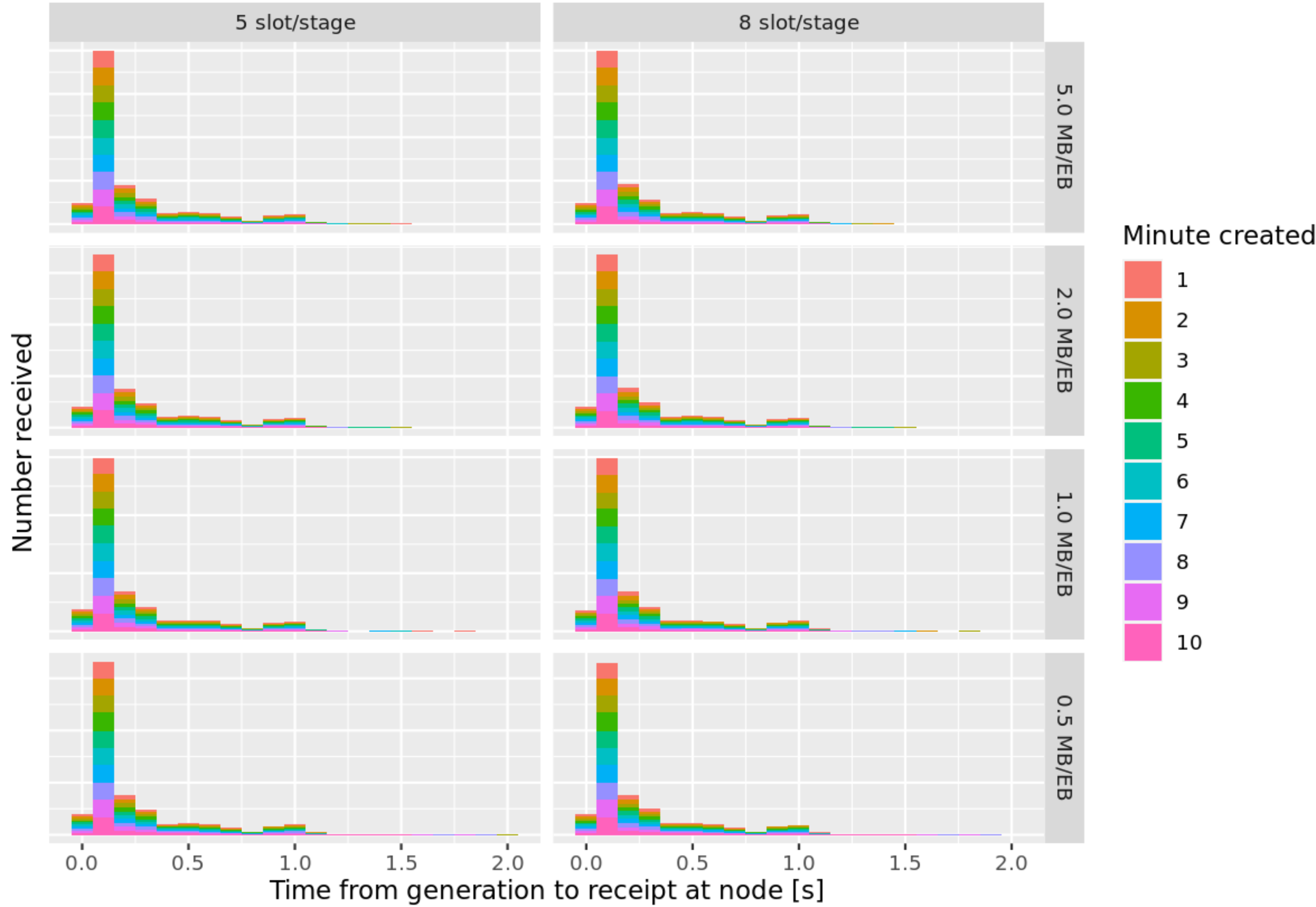
Rust simulator, mini-mainnet, linear, no txs



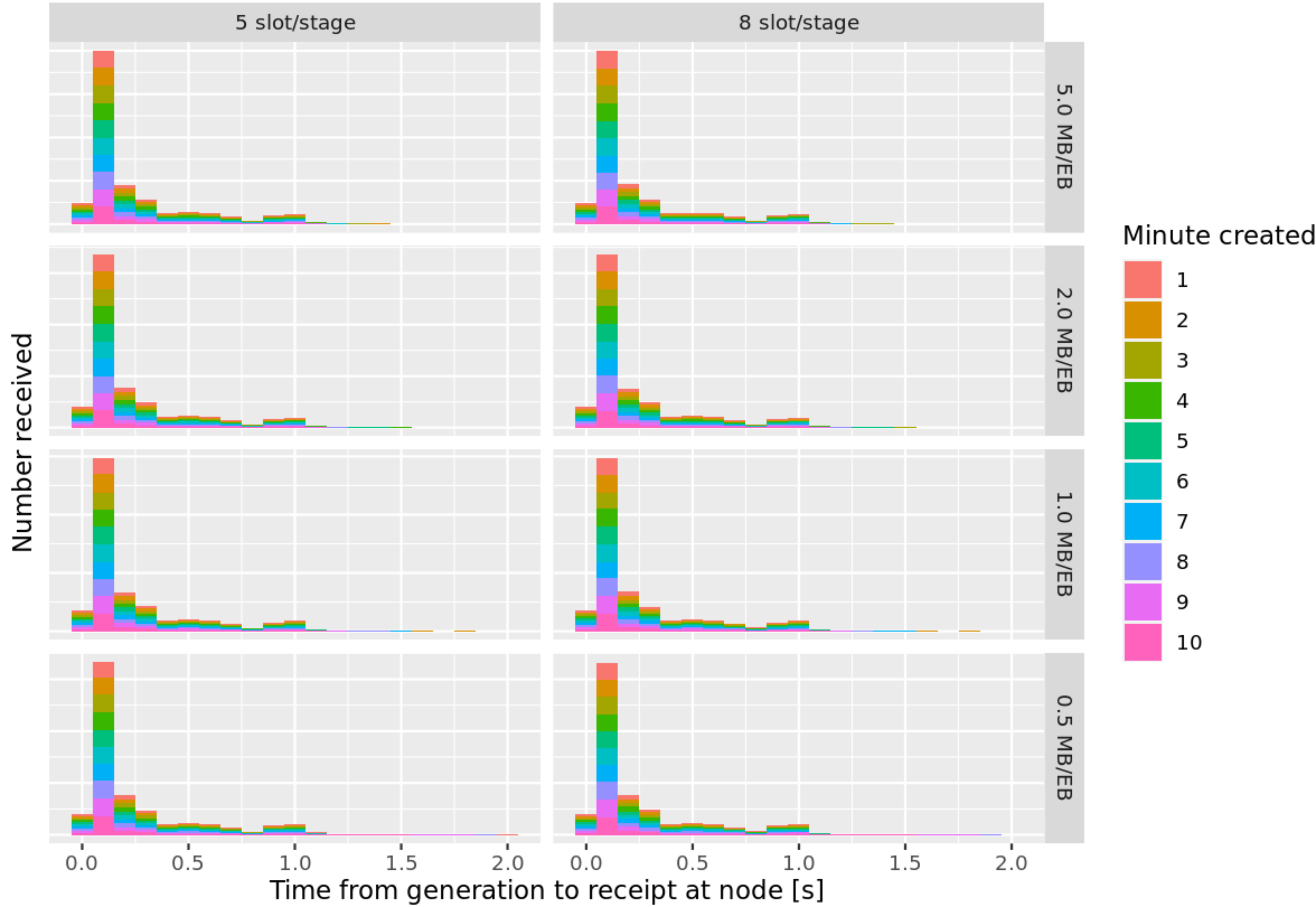
Arrival delay for TX
Rust simulator, mini-mainnet, linear-with-tx-references



Arrival delay for TX
Rust simulator, mini-mainnet, full-without-ibs

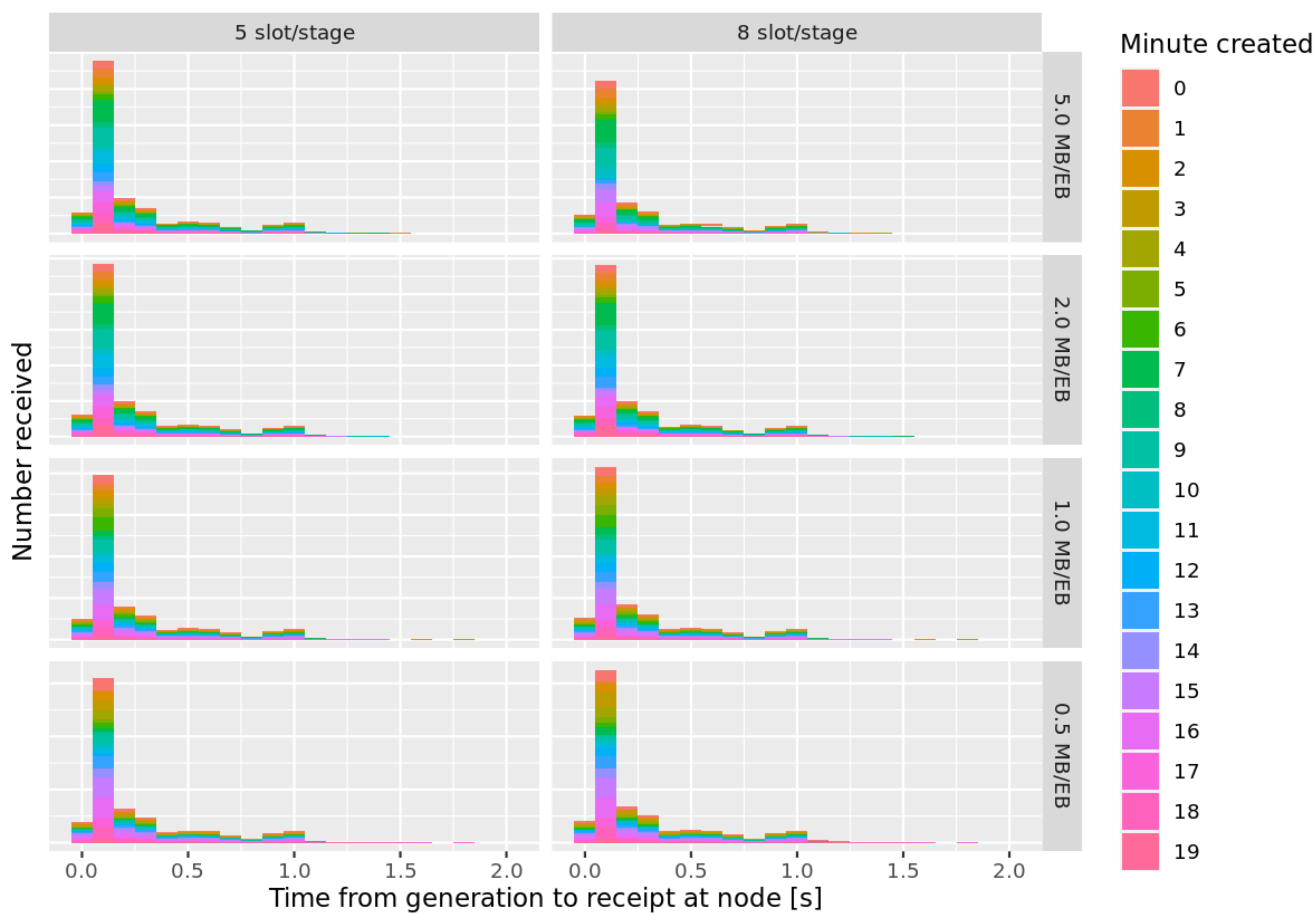


Arrival delay for TX
Rust simulator, mini-mainnet, linear



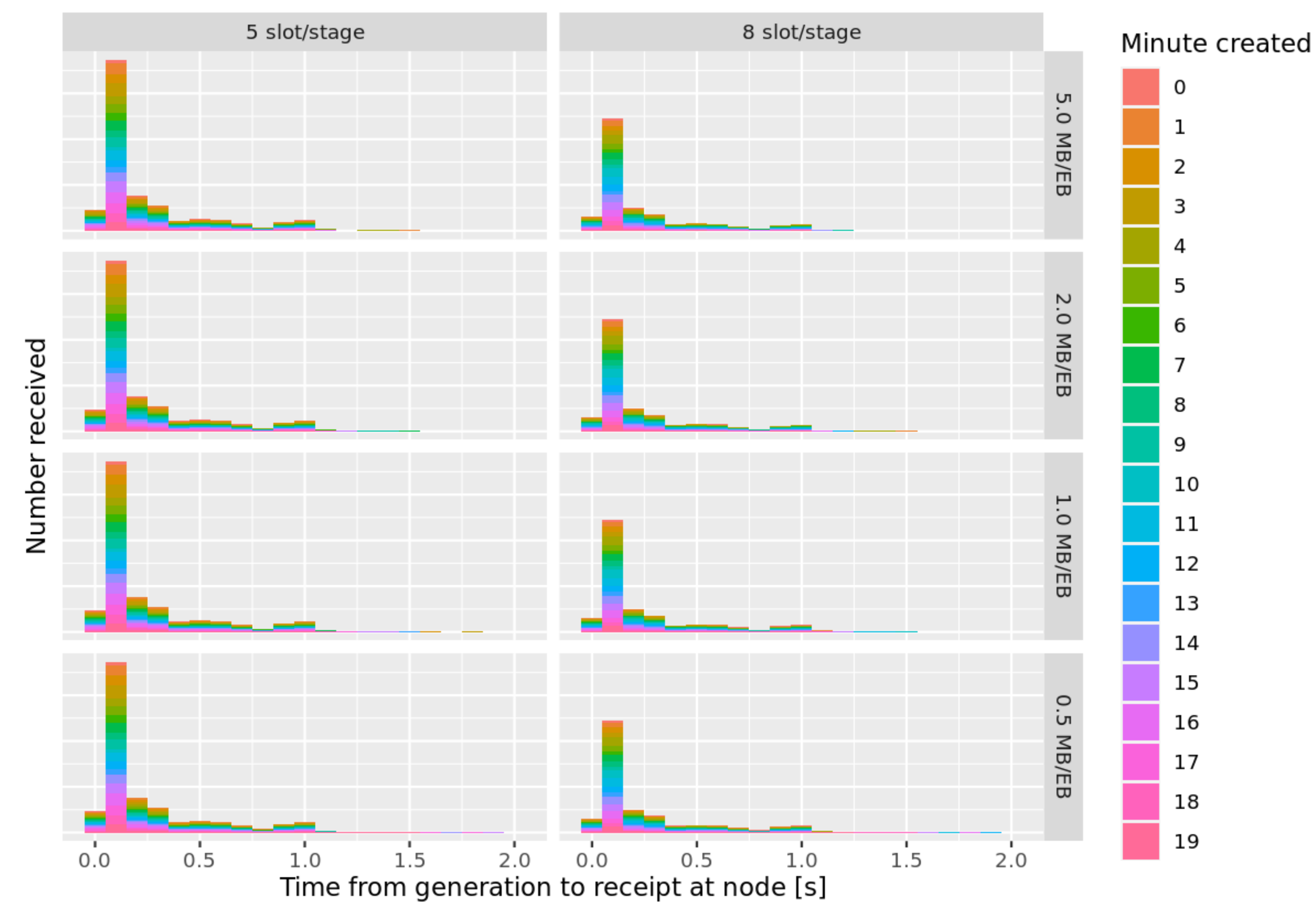
Arrival delay for VT

Rust simulator, mini-mainnet, linear-with-tx-references



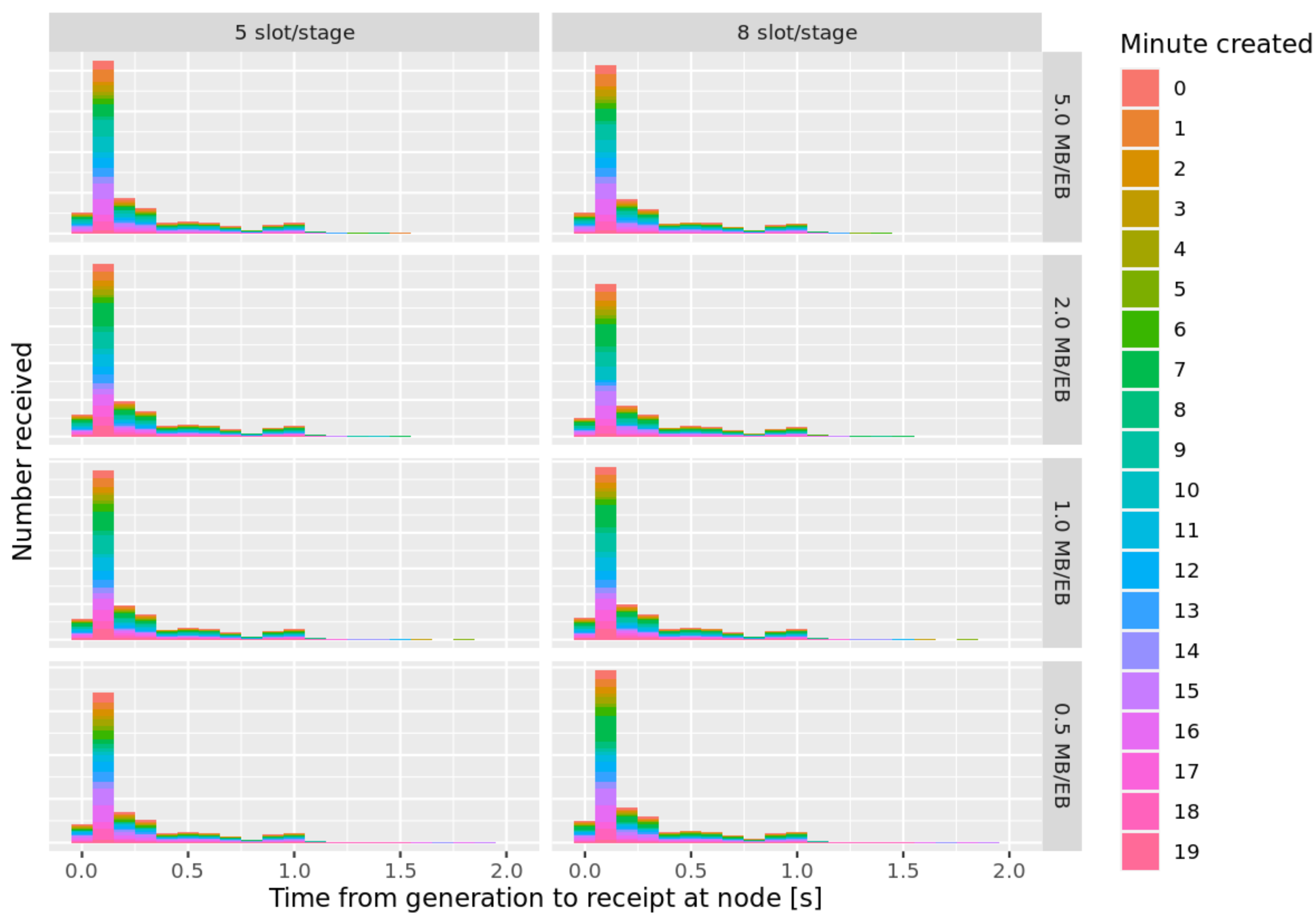
Arrival delay for VT

Rust simulator, mini-mainnet, full-without-ibs



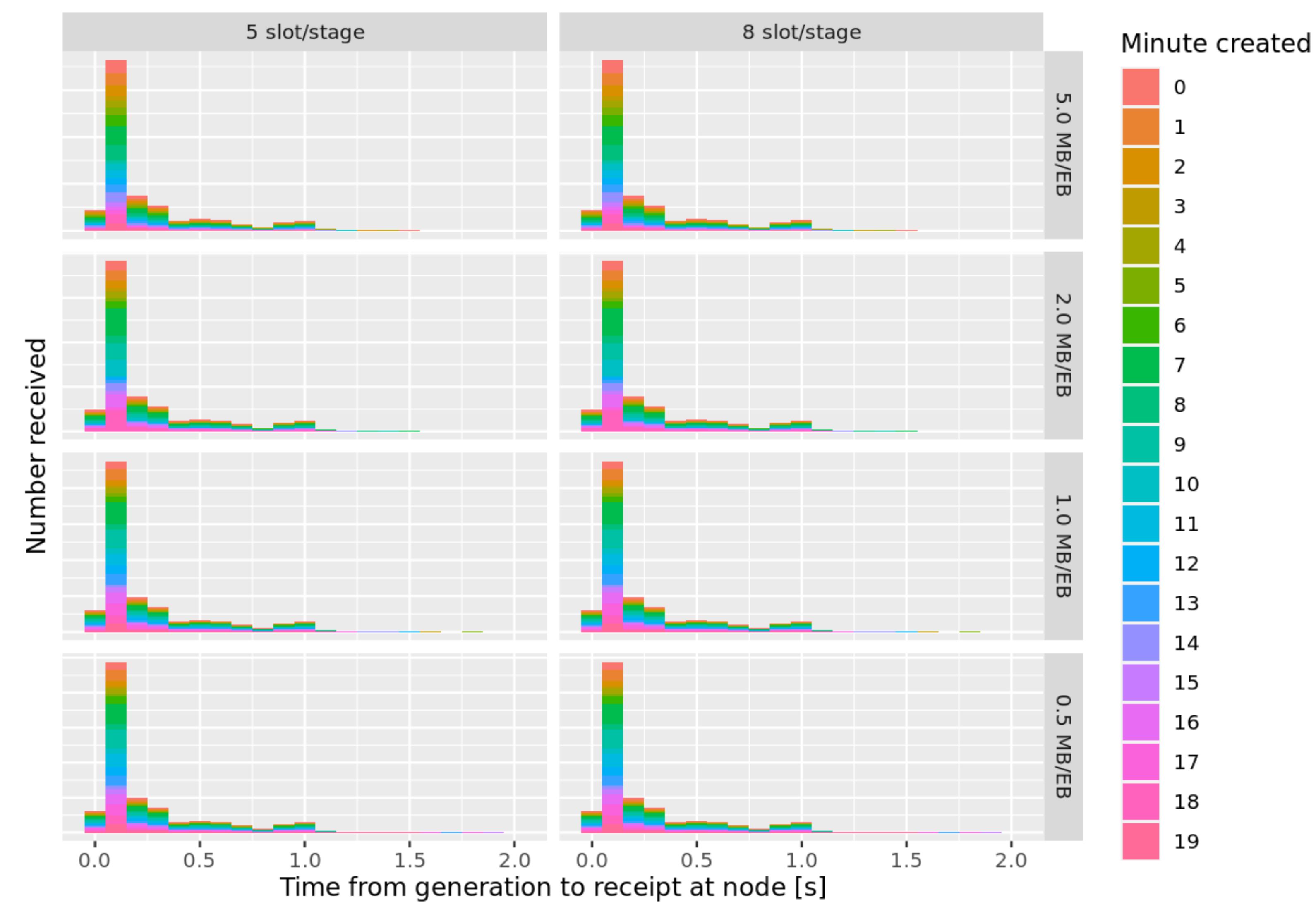
Arrival delay for VT

Rust simulator, mini-mainnet, linear



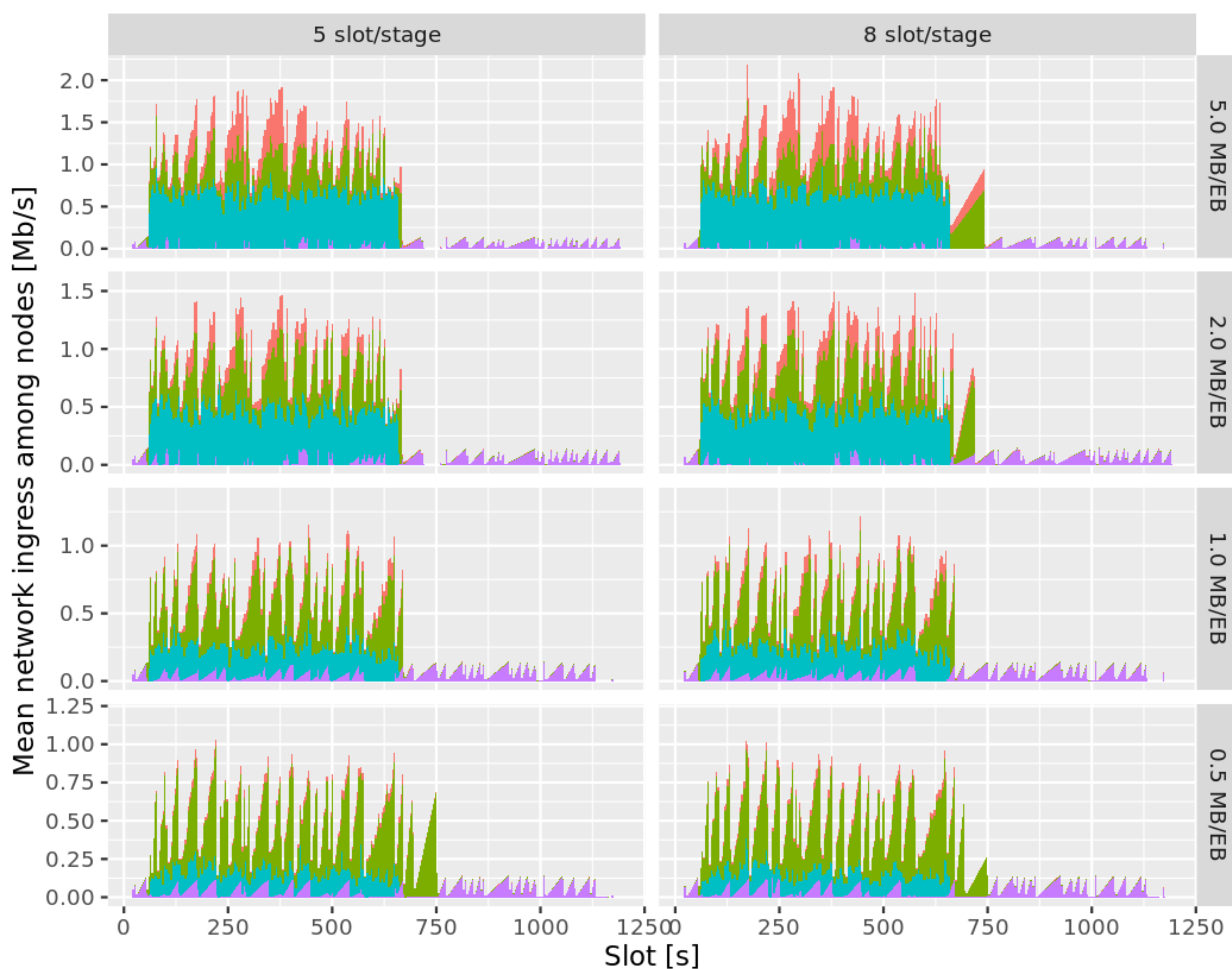
Arrival delay for VT

Rust simulator, mini-mainnet, linear, no txs



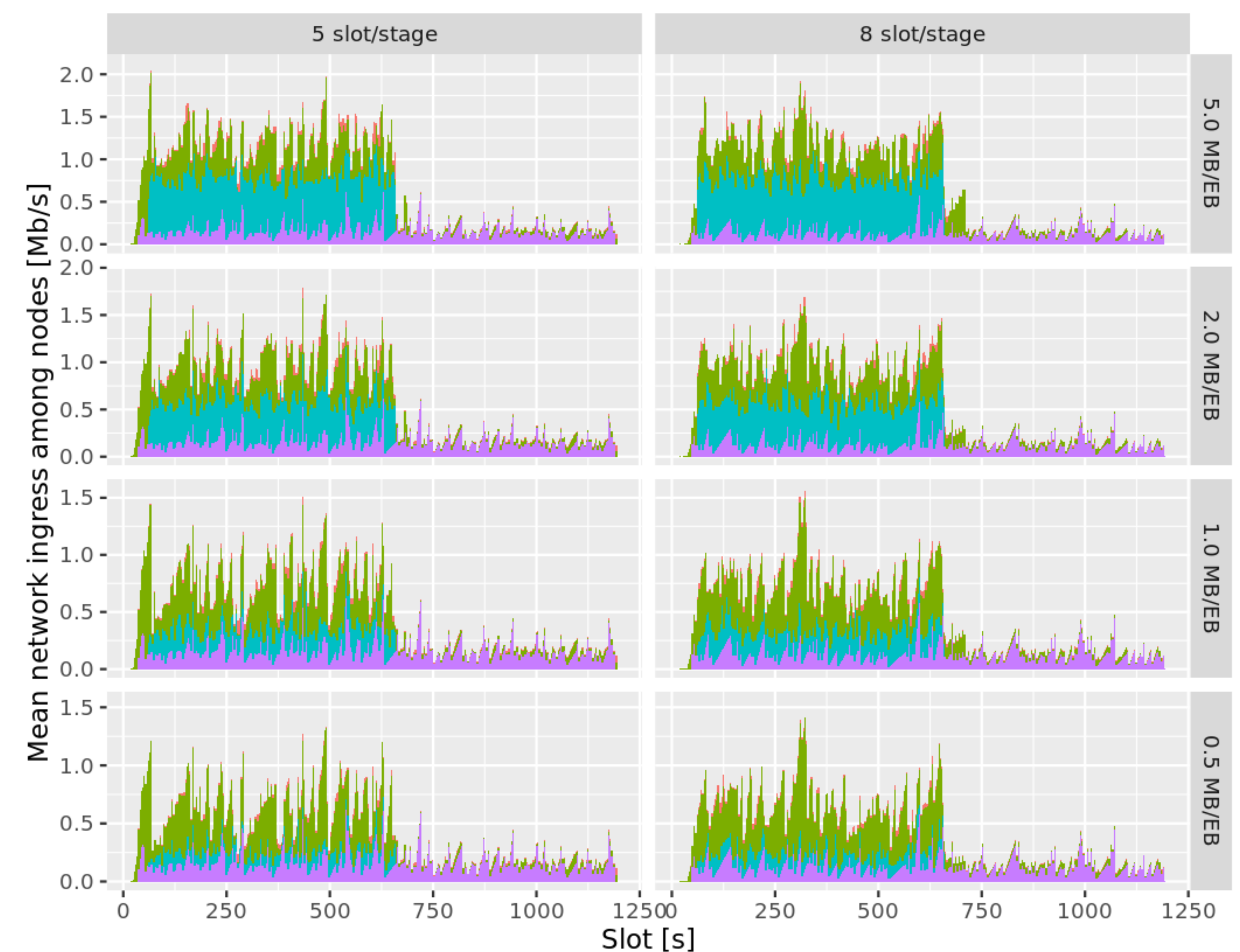
Mean nodal ingress

Rust simulator, mini-mainnet, linear-with-tx-references



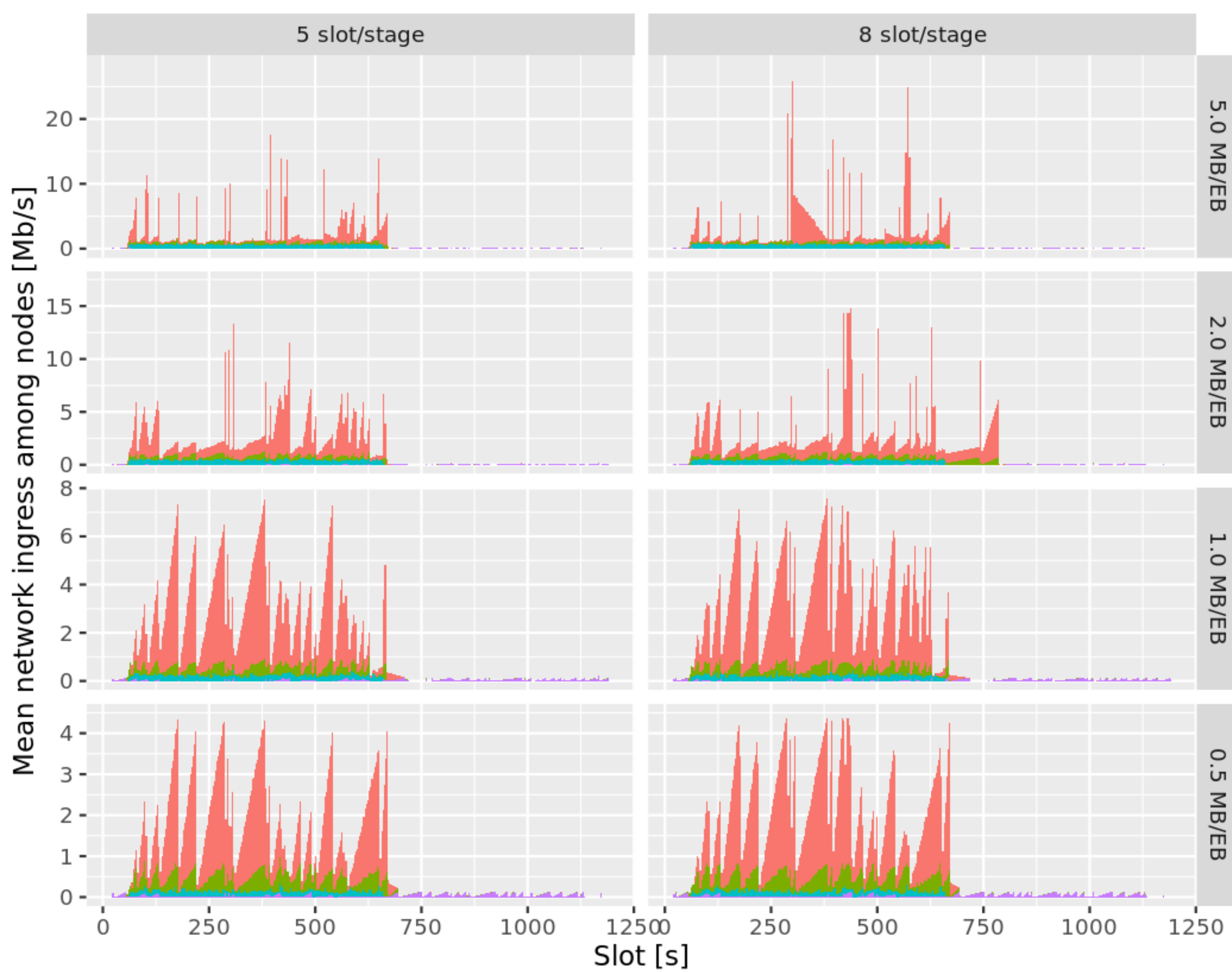
Mean nodal ingress

Rust simulator, mini-mainnet, full-without-ibs



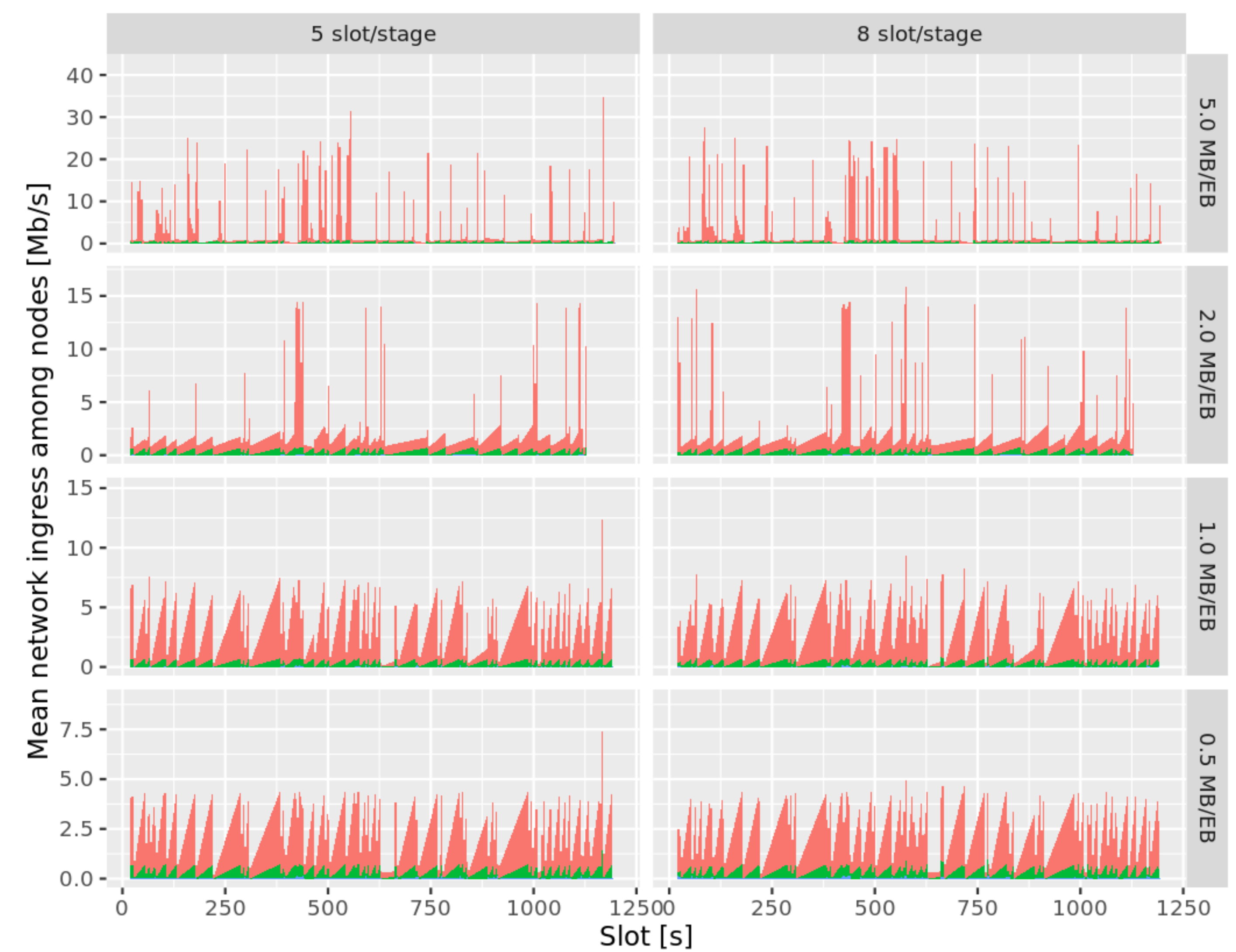
Mean nodal ingress

Rust simulator, mini-mainnet, linear



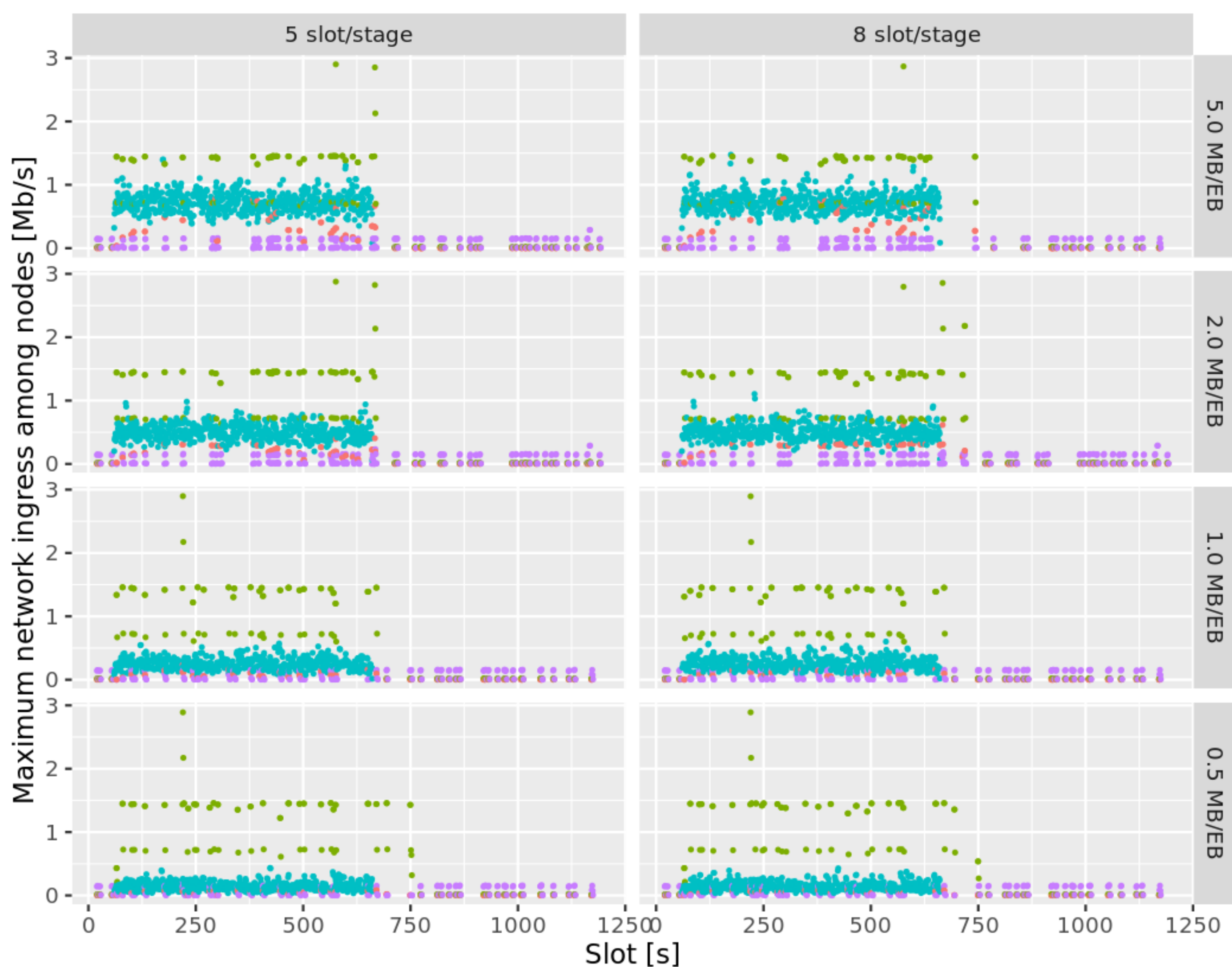
Mean nodal ingress

Rust simulator, mini-mainnet, linear, no txs



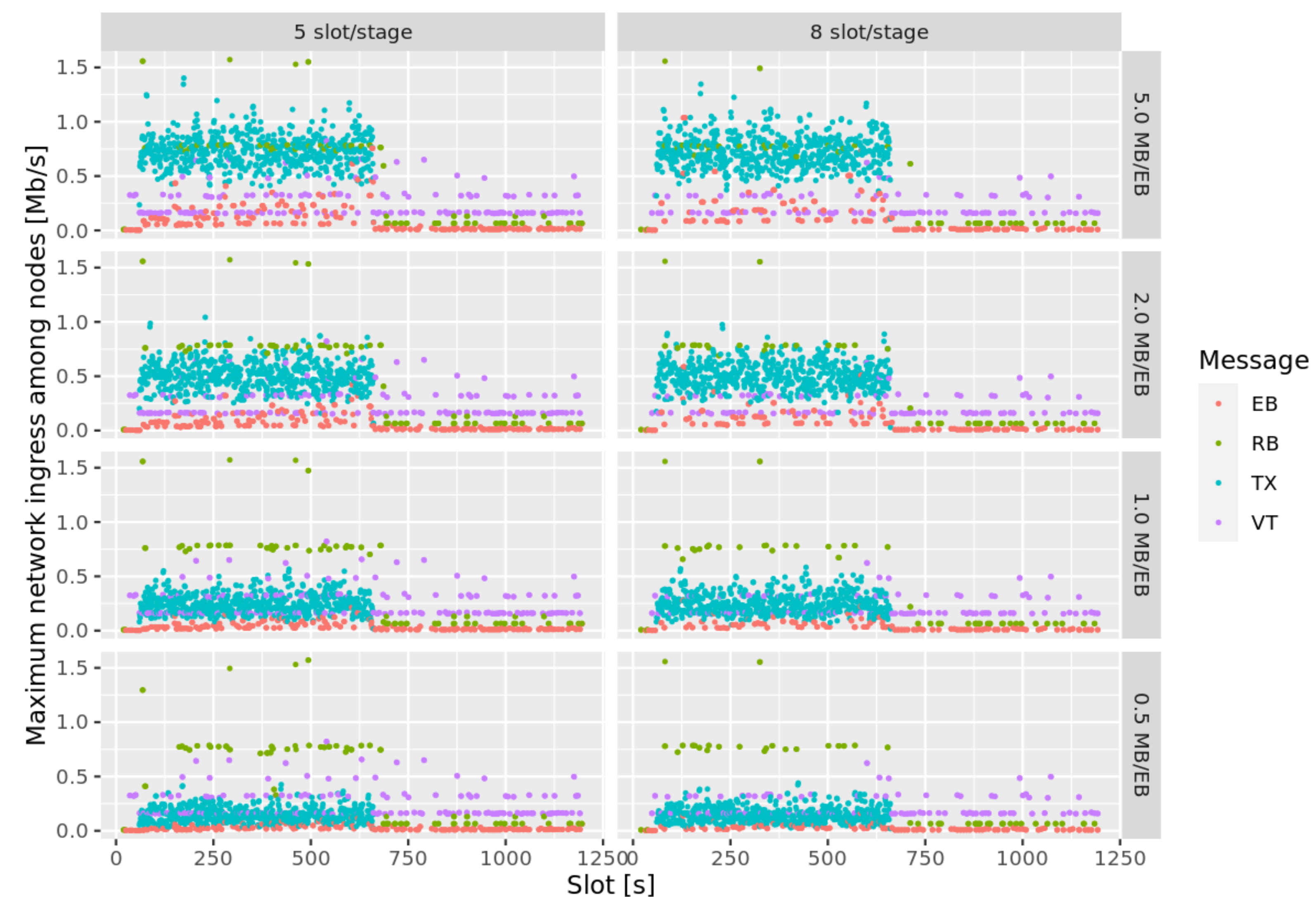
Peak nodal ingress

Rust simulator, mini-mainnet, linear-with-tx-references



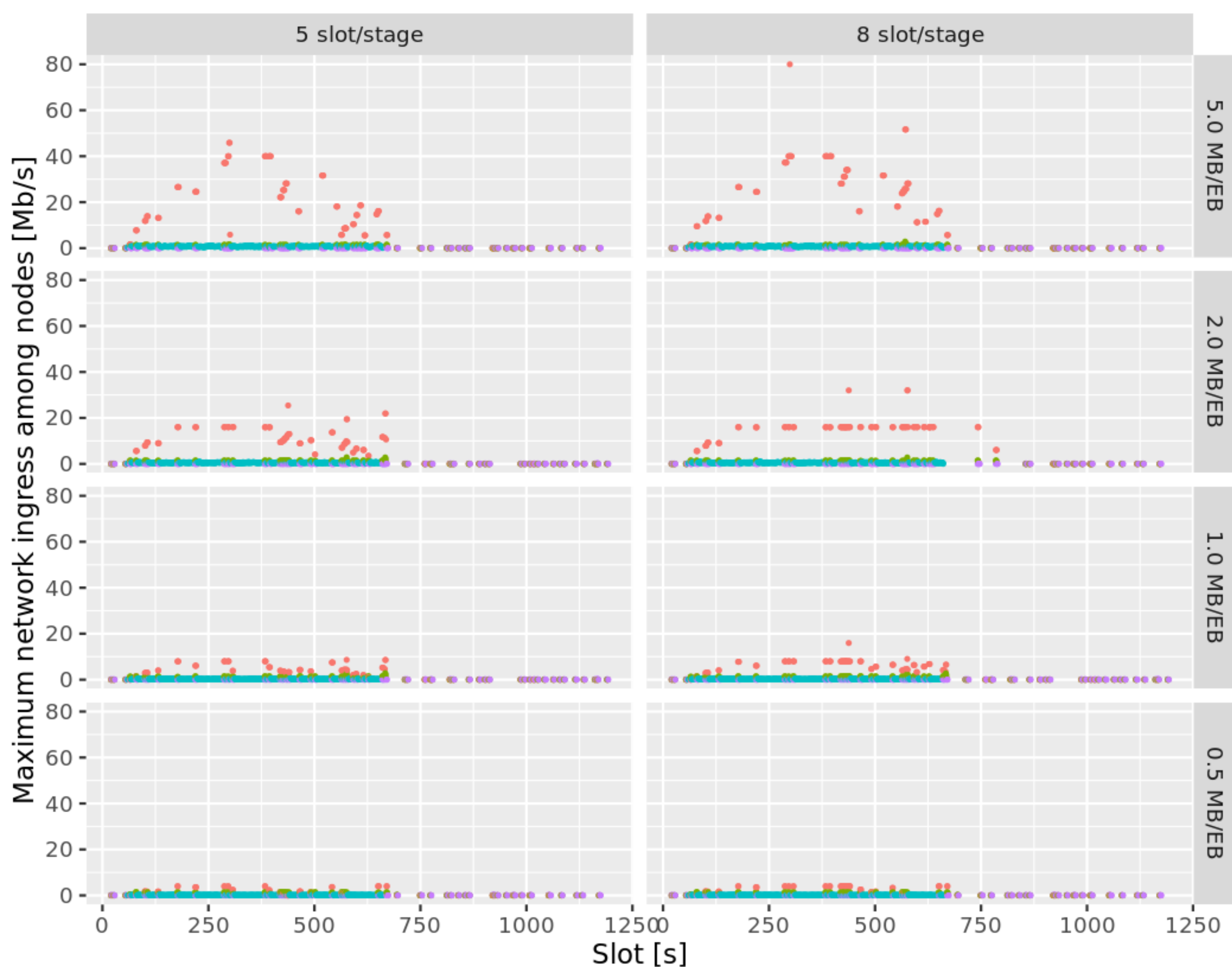
Peak nodal ingress

Rust simulator, mini-mainnet, full-without-ibs



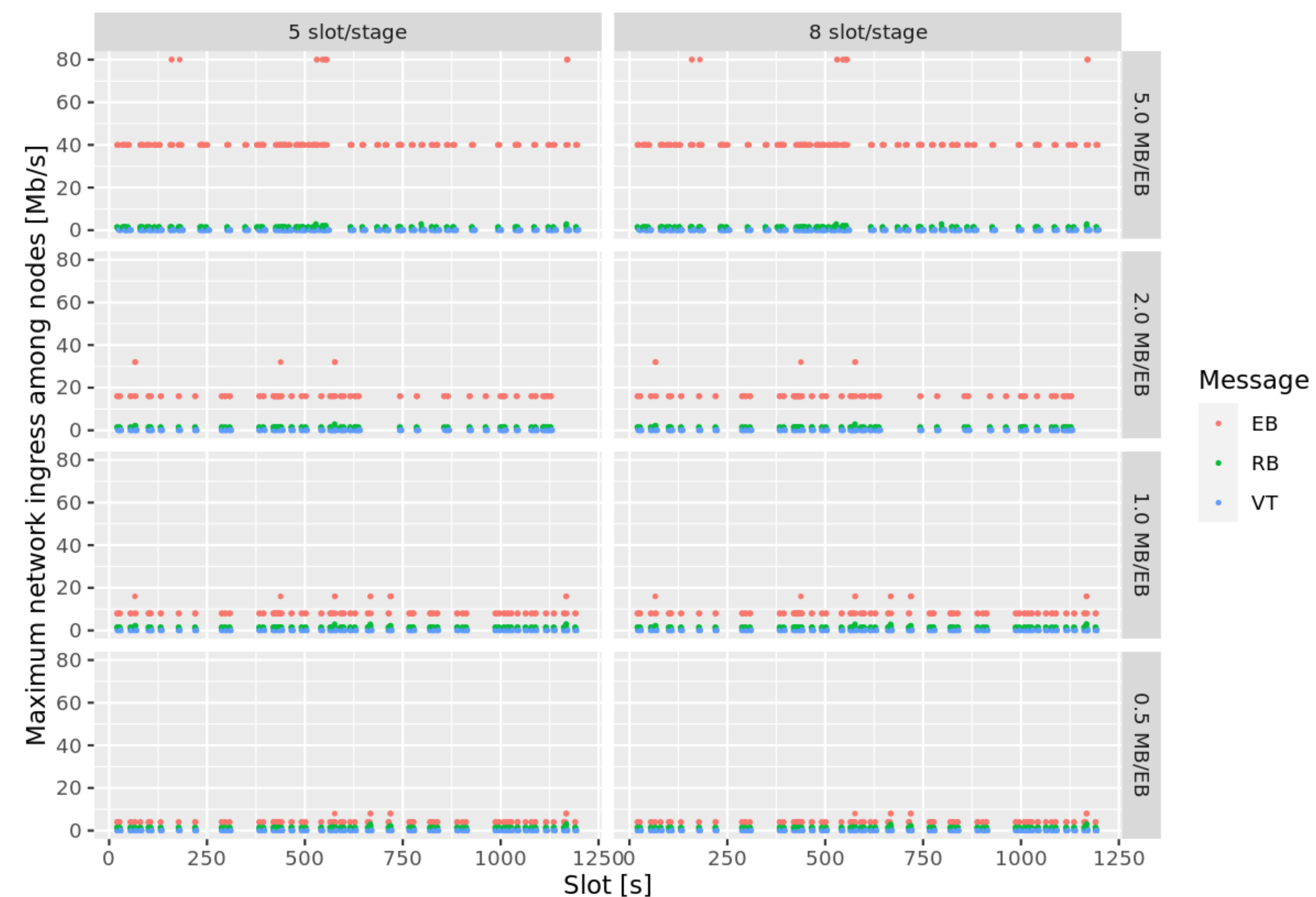
Peak nodal ingress

Rust simulator, mini-mainnet, linear



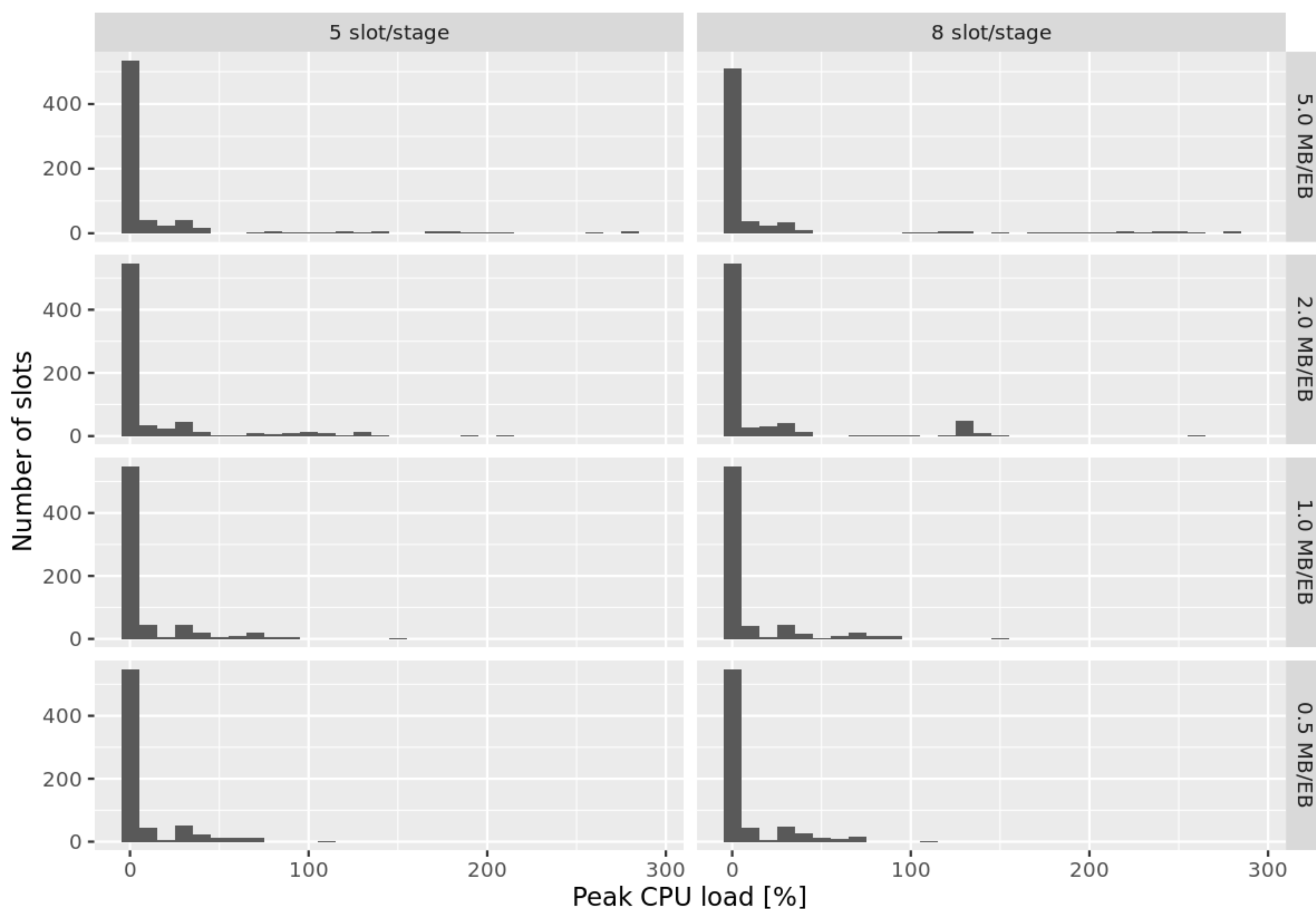
Peak nodal ingress

Rust simulator, mini-mainnet, linear, no txs



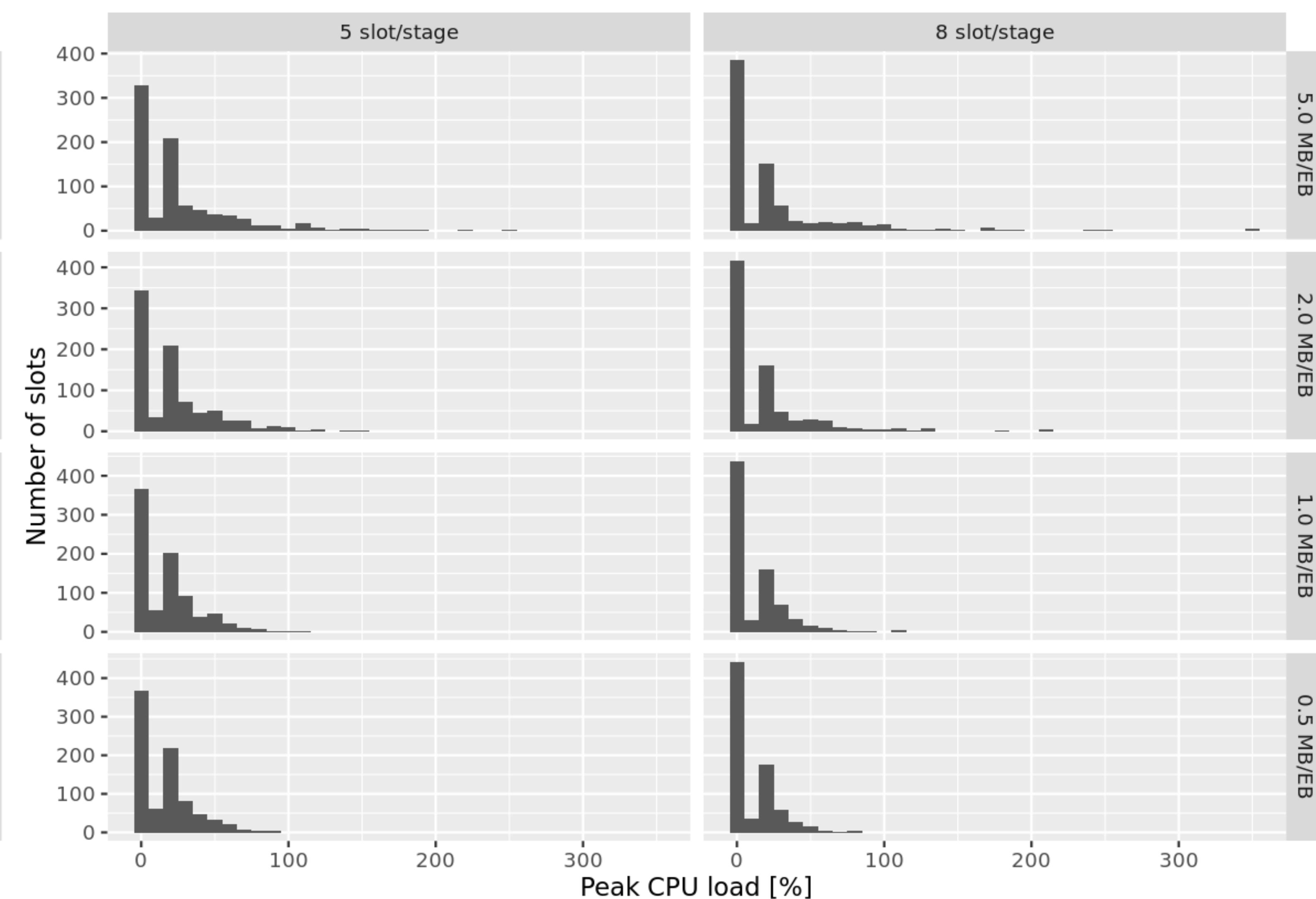
Peak CPU load among all nodes

Rust simulator, mini-mainnet, linear-with-tx-references



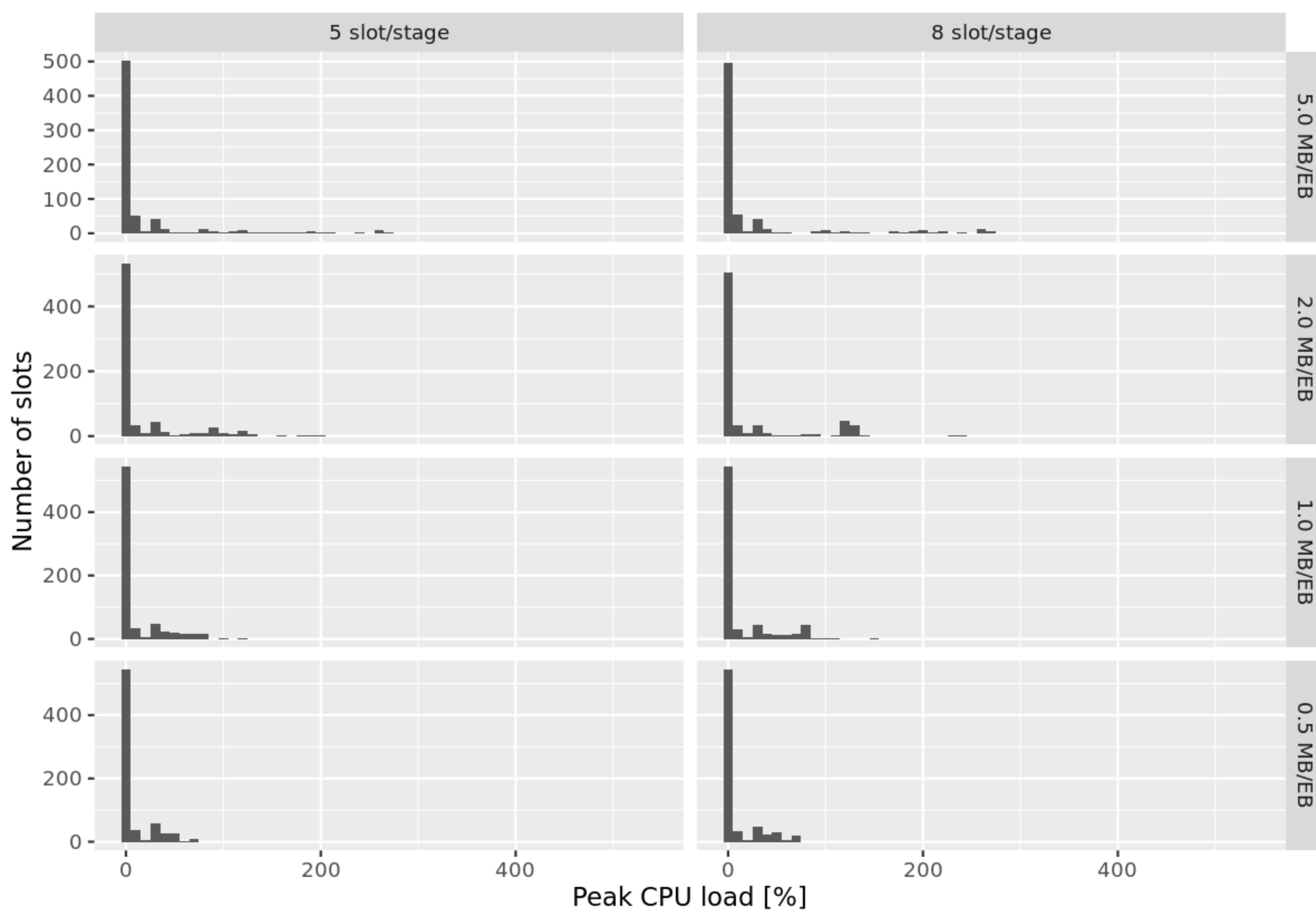
Peak CPU load among all nodes

Rust simulator, mini-mainnet, full-without-ibs



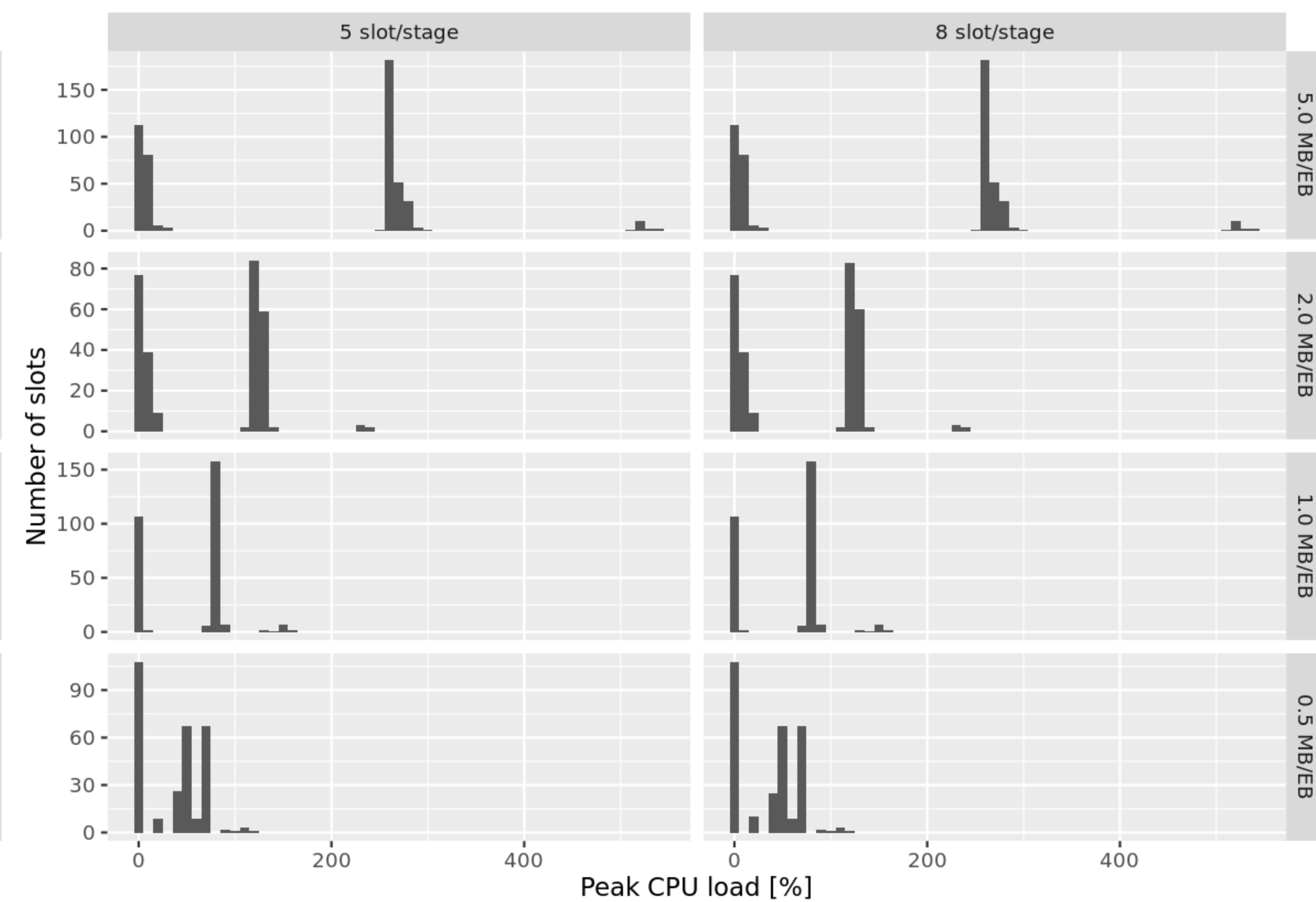
Peak CPU load among all nodes

Rust simulator, mini-mainnet, linear



Peak CPU load among all nodes

Rust simulator, mini-mainnet, linear, no txs



Mean CPU load among all nodes

Rust simulator, mini-mainnet, linear-with-tx-references



Mean CPU load among all nodes

Rust simulator, mini-mainnet, full-without-ibs



Mean CPU load among all nodes

Rust simulator, mini-mainnet, linear



Mean CPU load among all nodes

Rust simulator, mini-mainnet, linear, no txs

