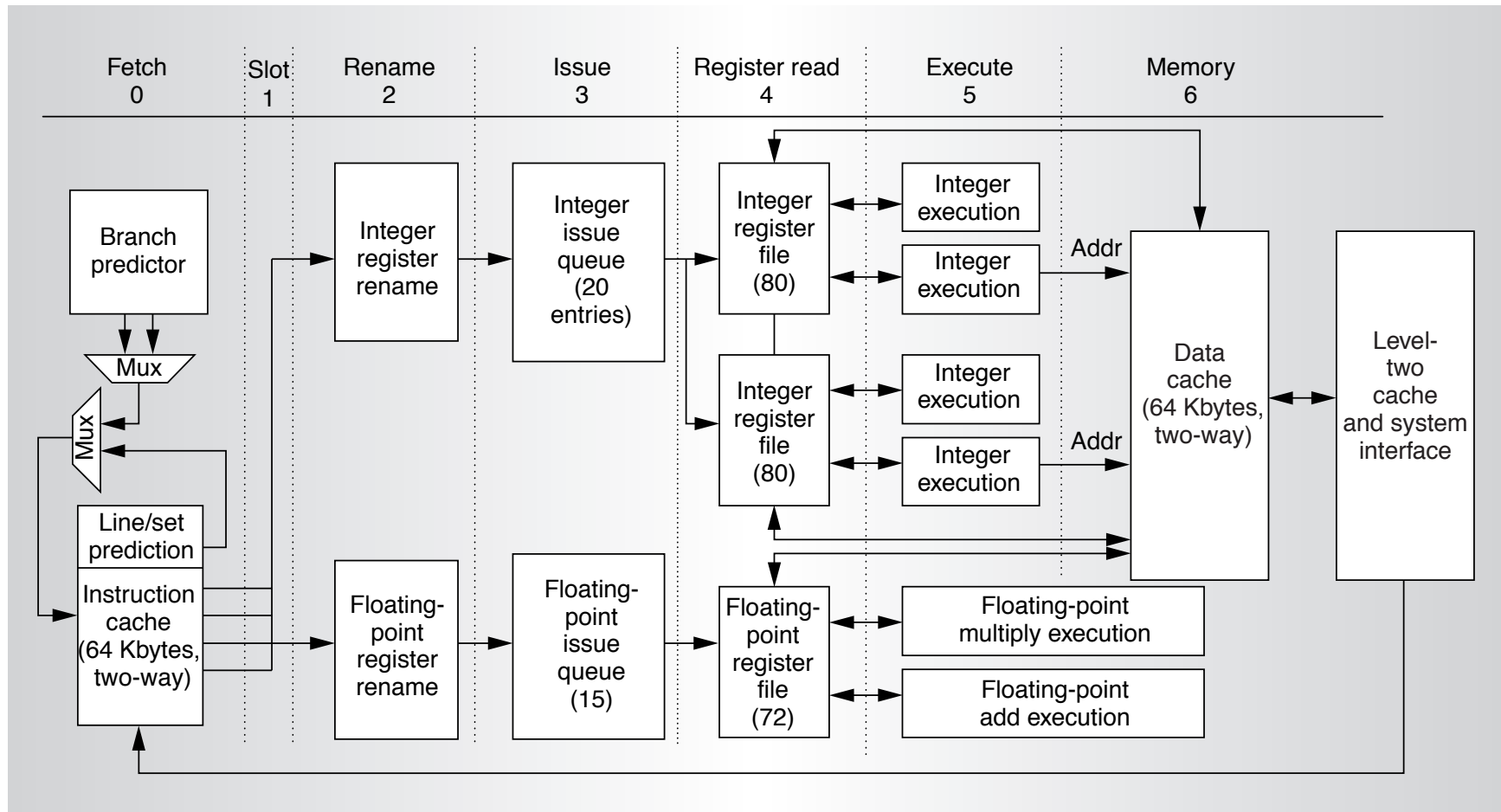


Alpha Microprocessor

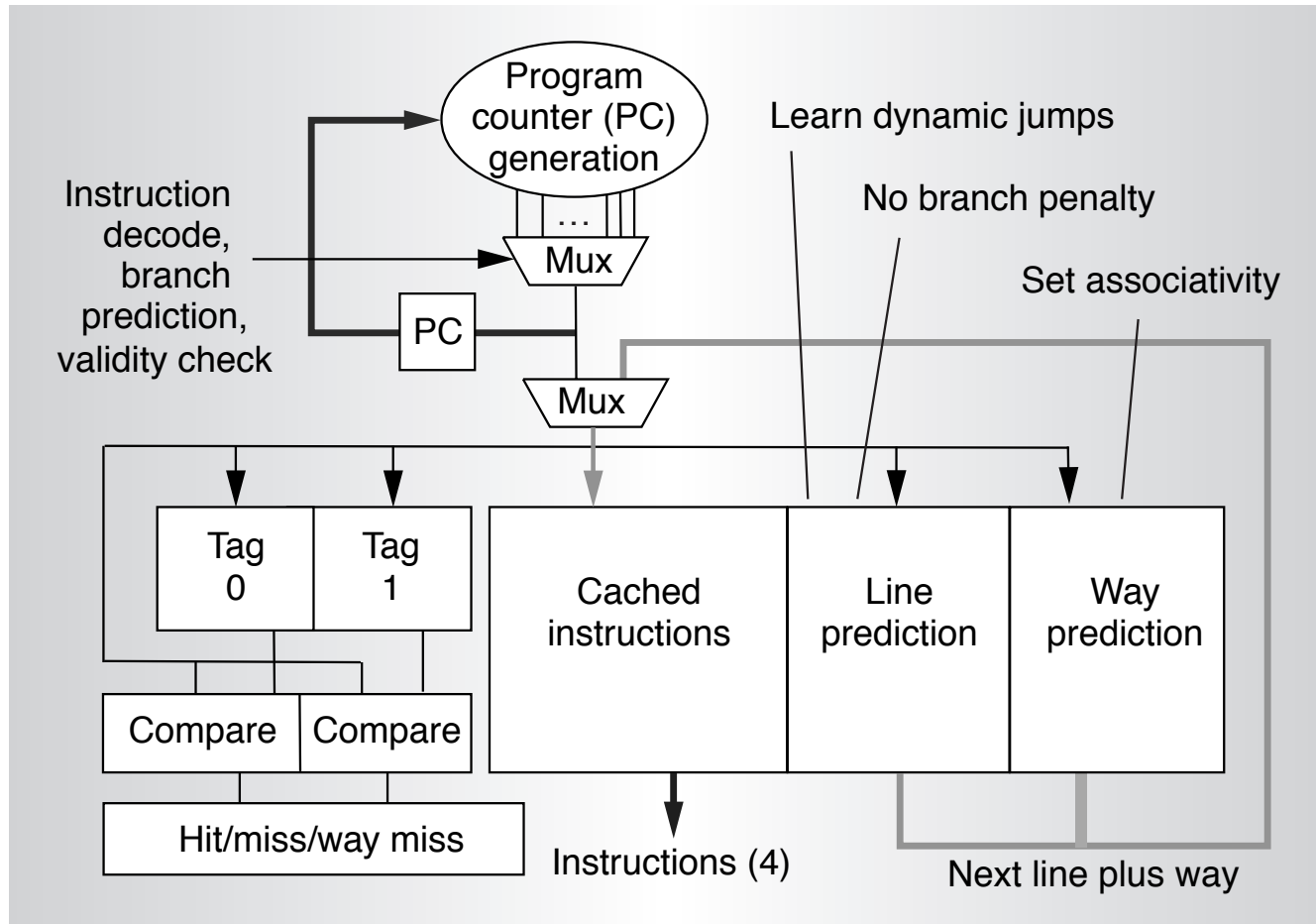
Alpha History

- Created by DEC (Digital Equipment Corporation)
 - RISC successor to VAX (Alpha 21064)
 - Innovative
 - Very high clock rates
 - Manual circuit design/layout
 - Large on-chip L2 cache (21164)
 - Out of order execution (21264)
 - On-chip memory controller (21364)
 - Simultaneous multithreading (21464 – canceled)
- Bought by Compaq (in turn bought by HP)
 - Alpha canceled in favor of Intel Itanium

Alpha Microprocessor



Way Prediction



Branch Predictor

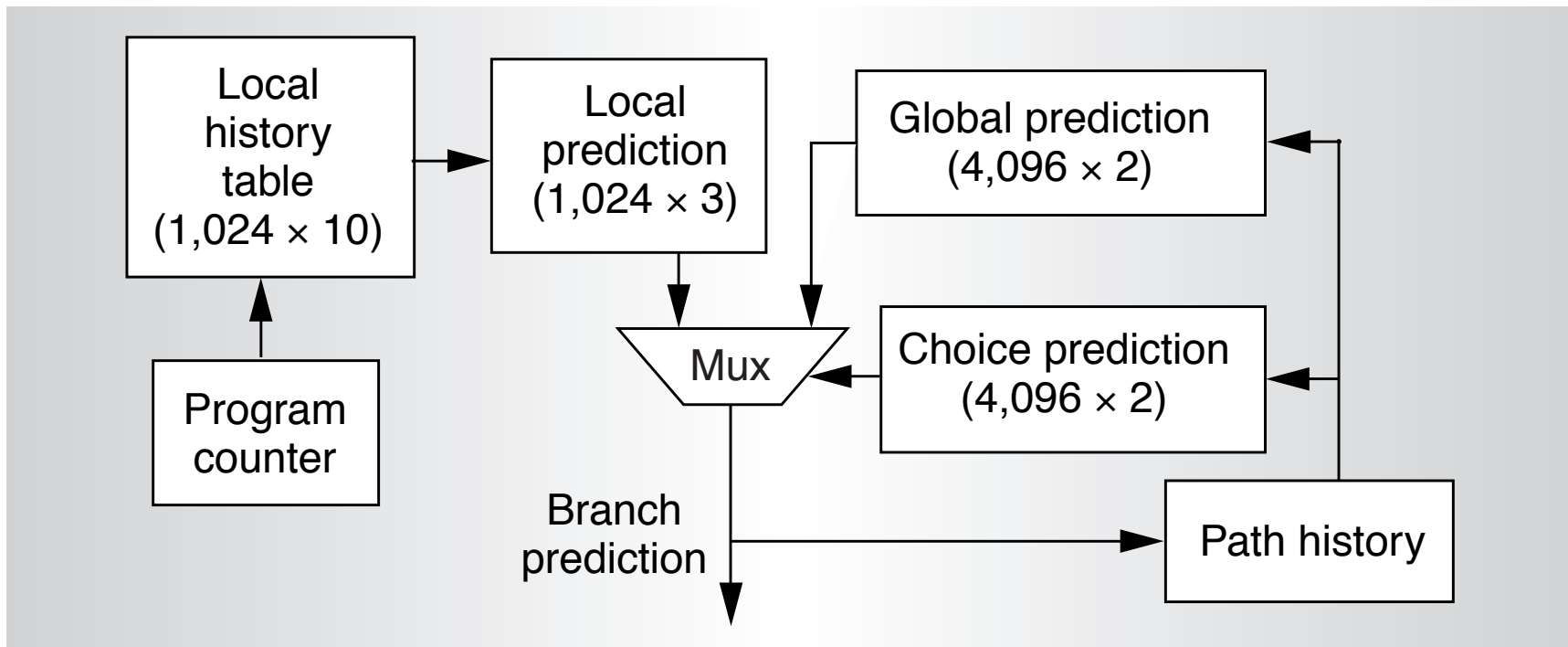
Importance of branch prediction

21164: 20 in-flight instructions

21264: 80 in-flight instructions

Employs tournament branch predictor

Chooses between local/global predictors



Branch Predictor

Local history and predictors are updated when branch instruction is retired

Path history is speculatively updated

If mispredicted, must be backed out

How?

