

PCIe Link

Write Buffer

FTL  
Instance

FTL  
Instance

FTL  
Instance

Channel

Die

Die

Die

Die

Block

Block

Block

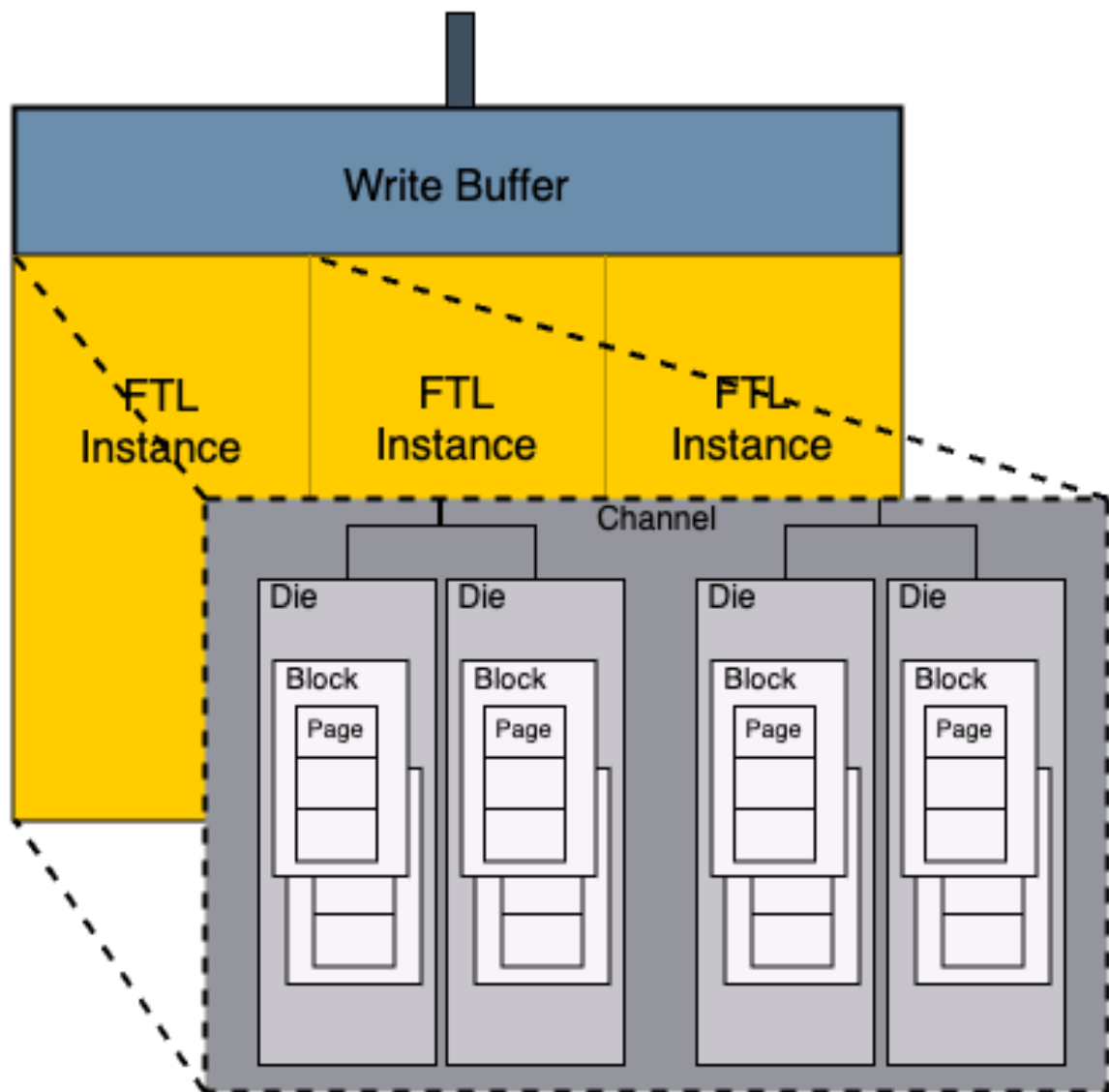
Block

Page

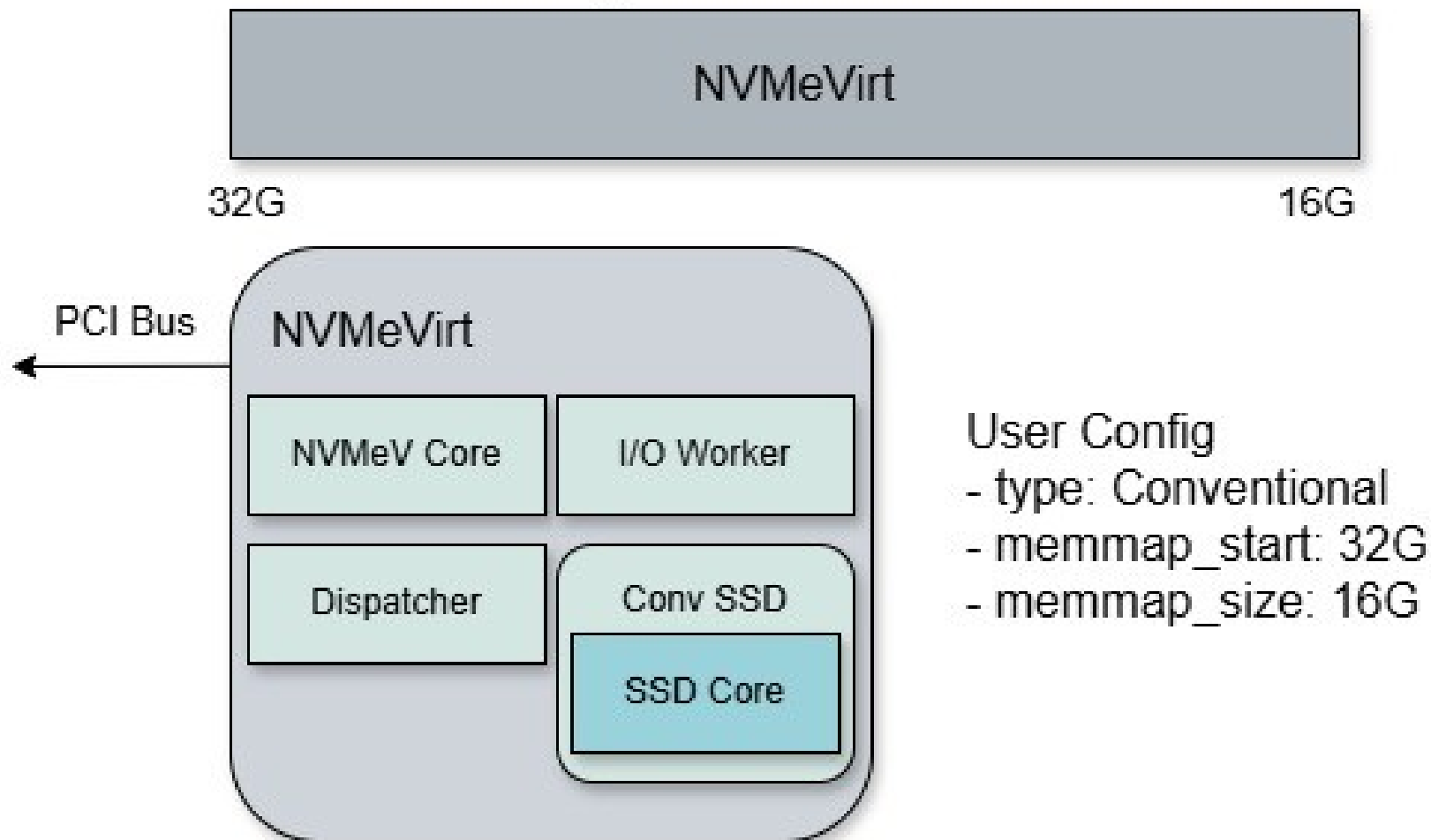
Page

Page

Page

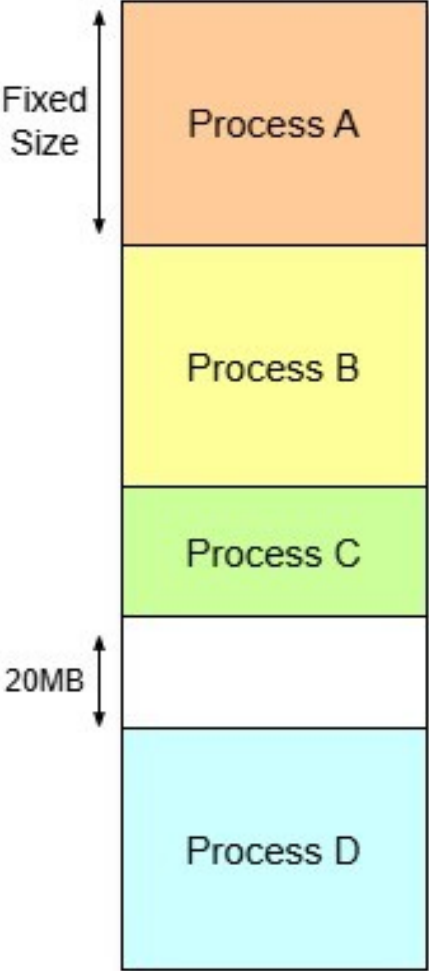


## Reserved Memory Address

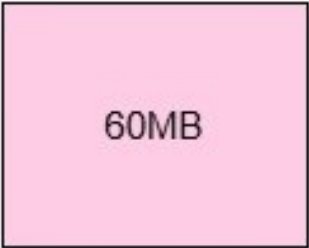
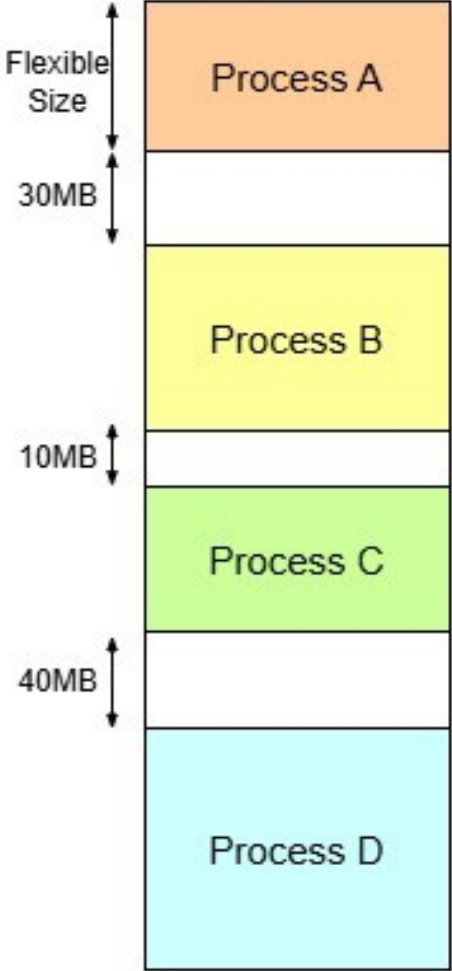


Free Space Fragmentation

Internal Fragmentation



External Fragmentation



## Data Fragmentation

### Logical Fragmentation

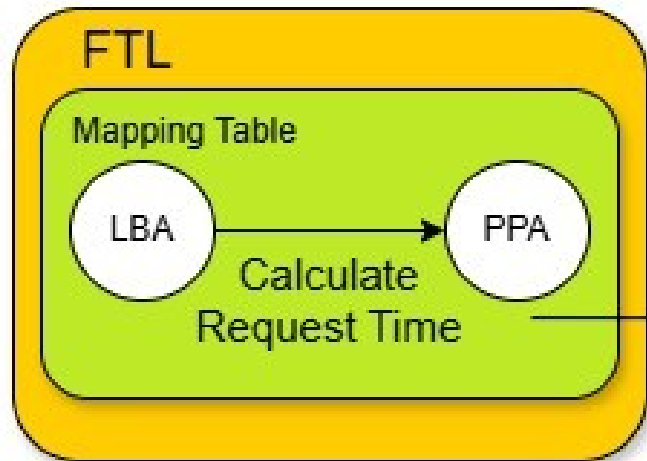
Total 3 I/O Request

LBN1	1 I/O	PBN1
LBN2		PBN2
LBN3		PBN3
FREE	2 I/O	PBN4
LBN4		PBN5
LBN5		PBN6
LBN6	3 I/O	PBN7
FREE		FREE
LBN7		FREE
FREE		FREE
FREE		FREE

### Physical Fragmentation

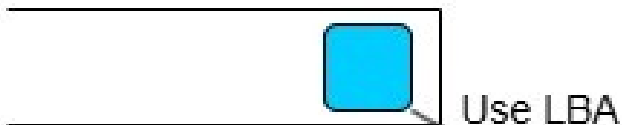
Only 1 I/O Request  
But ...

LBN1		PBN1
LBN2		PBN2
LBN3		FREE
LBN4		FREE
FREE		PBN3
FREE		PBN4
FREE		FREE
FREE		FREE
FREE		FREE
FREE		FREE
FREE		FREE



Have many the I/O Worker...

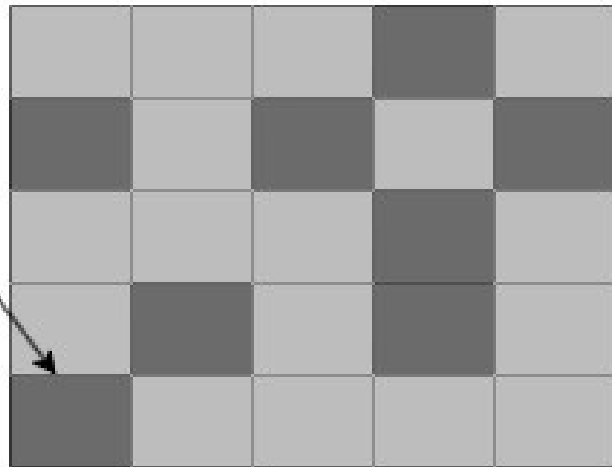
I/O Worker1



Use LBA

Use Calculated Request Time

Reserved Memory



# Conventional FTL

