* Open-Channel SSDs differ from a traditional SSD in that they expose the internal parallelism of the SSD to the host and allows it manage it.  
    
  **PROVISIONING WORKLOADS IS THE KEY  
  Fitting Truck and Car in a small available Parking Lot, Optimally**
* giving controlling unit to the hands of OS

## **I/O Isolation**

I/O isolation provides a method to divide the capacity of the SSD into a number of I/O channels that map the parallel units of the device (LUNs). This enables an Open-Channel SSD to be used in multi-tenant applications without tenants interfering with each other.

## **Predictable latency -**

Predictable latency is achieved by having control in the host over when, where and how I/O are submitted to the SSD.  
**Predictable latency** in SSDs generally has a different connotation. It means that for any given IO operation, the latency of that operation should be completed in a max. specified latency (and definitely not more than that). The application should be able to have predictable behavior based on that latency.

## **Software-Defined Non-Volatile Memory**

By integrating the SSD flash translation layer into the host, workload optimizations can be applied either within a self-contained flash translation layer, file-system integration or applications themselves.

* liblightnvm is a set of API’s used by users to get Open SSD info and control them
* NAND flash die is comprised of planes, which contain blocks, which contain pages… which contain individual cells of data  
  i.e. DIE -----> PLANES ------> BLOCKS --------> PAGES --------> INDIVIDUAL CELLS OF DATA  
    
  Read and Write Take Place at Page Level, but Erase operation take place at block level, and hence “heavy” operations
* **Features of Flash Translation Layer** (**FTL**) (to protect less erases and r/w operations, for less wear-tear of flash drives):
  + write updated information to a new empty page and then divert all subsequent read requests to its new address
  + ensure that newly-programmed pages are evenly distributed across all of the available flash so that it wears evenly
  + keep a list of all the old invalid pages so that at some point later on they can all be recycled ready for reuse

Traditional SSDs and OC-SSD both perform necessary garbage collection (GC) in background

**LUNs are logical unit number, kind of uuid to physical parallel units of a device.**

* Other Resources:  
  <https://events.static.linuxfound.org/sites/events/files/slides/LightNVM-Vault2015.pdf>  
   **need of IO Isolation in multi tenant**  
  <https://www.researchgate.net/publication/315510283_Multi-Tenant_IO_Isolation_with_Open-Channel_SSDs>
* For complete layman understanding of lightNVM and FTL  
  <https://www.flashmemorysummit.com/English/Collaterals/Proceedings/2016/20160809_FB12_Huang.pdf>