# Azure IaaS SQL Best Practices

* Below is the Checklist for IaaS SQL Servers.
* I created a summary/checklist from SPOPerf documentation.

**Azure IaaS SQL Checklist**

1. D11-D14 SKUs are the recommended sizes for SQL Server.
   1. TEMPDB should be placed on the "temporary storage" drive (This disk is capable of 10k IOPS at almost 0 latency)
   2. Enable BPE on D Series SKU and place on the "temporary storage" drive with TEMPDB.
2. You should always run on the latest SqlOps-certified CU for the installed SQL Server version or later.
   1. If at all possible, you should run SQL Server 2014 or later.
3. If you are running SQL Server 2014 or later and are using columnstore indexes, the server MAXDOP should be greater than 1 to enable batch mode processing on columnstore queries
4. Configure the database "target recovery time" setting to 120 seconds.
5. Update to the Latest database compatibility level on your DB's.
6. Database Transaction Logs
   1. Check your VLF's for over 250 rows.
7. Enable Database Compression (Compress tables & indexes), this greatly reduces I/O.
   1. See attached Script for identifying
8. Run SQLOPS "\_SQL\_RebuildIndexes", at least once per week.
   1. Make sure the job will retain Compression when indexes are rebuilt.
9. Run SQLOPS "\_SQL\_UpdateStatsAll" all Job every day before major workload period
10. File Allocation Unit Size (Bytes per cluster 65,536)
11. Enable instant file initialization for data files
    1. Done by the SQL IPAK (if you use it)
12. Limit or disable autogrow
    1. Application DB change, up to App Owner
13. Disable autoshrink
    1. Application DB change, up to App Owner
14. Move all databases to data disks, including system databases
    1. Done by the IPAK if you use anything other than C for the /DAT parameter
15. Enable locked pages
    1. Done by the SQL IPAK (if you use it)

**SQL Storage Recommendations**

1. There are several benefits to creating multiple files per filegroup
2. Having more than one file reduces page allocation map contention
3. SQL Server creates multiple IO threads for accessing multiple data files, increasing Disk IO queue depth
4. Individual files can be kept to a reasonable size for physical file operations, such as moving files in the server filesystem, or copying to other servers. SPOPerf recommends a maximum size of 224GB per data file. This allows 4 max size files to fit on a single 1TB volume.
5. Each data file can be placed on a different Azure disk for increased aggregate IO throughput.
6. For databases larger than 25GB, SPOPerf recommends moving all user tables and indexes to

filegroups other than PRIMARY.

* 1. How many filegroups should I have?
     1. Create two additional filegroups, DATA and IDX.
        1. DATA is for clustered indexes and heaps (tables with no clustered indexes). In general, heaps should be avoided, and every table should have a clustered index.
        2. IDX is for non-clustered indexes.
  2. How many data files should I have per filegroup?
     1. SPOPerf determines the number of files based on the amount of used space in the filegroup. If your data is not currently page compressed, it will use significantly less space after being rebuild. In my experience, 40% of the original size is typical.
        1. Filegroups with < 28GB data, 2 files
        2. Filegroups with 28GB-448GB data, 4 files
        3. Filegroups with 448GB-2TB data, 8 files