**Download / Copy SQL Server 2016 SP2 on respective server.**

**Steps to apply SQL Server 2016 SP2 on Dev, Test, QA & Prod (StandAlone) SQL Instances.**

**Development environments: (Standalone SQL Instance)**

* 1. Issue a full backup of all user and system databases including the Resource database.
  2. Take note of all the Startup parameters.
  3. Extract all SQL Server Logins, DB Permissions, SP\_CONFIGURE details.
  4. Install the service pack on Development SQL Server Instance.
  5. If needed, restart Windows Server or Restart SQL Services.
  6. Post this verify SQL Server 2016 is installed with SP2.

**Test environments: (Standalone SQL Instance)**

* 1. Issue a full backup of all user and system databases including the Resource database.
  2. Take note of all the Startup parameters.
  3. Extract all SQL Server Logins, DB Permissions, SP\_CONFIGURE details.
  4. Install the service pack on Test SQL Server Instance
  5. If needed, restart Windows Server or Restart SQL Services.
  6. Post this verify SQL Server 2016 is installed with SP2.

**QA & Production environments**: **(Standalone SQL Instance)**

* 1. Need to plan for a scheduled downtime on the Production Servers as it takes approximately 30 to 45 minutes to apply the service pack on SQL Server 2016.
  2. Issue a full backup of all user and system databases including the Resource database.
  3. Take note of all the Startup parameters.
  4. Extract all SQL Server Logins, DB Permissions, SP\_CONFIGURE details.
  5. Install the service pack on Prod SQL Server Instance.
  6. If needed, restart Windows Server or Restart SQL Services.
  7. Post this verify SQL Server 2016 is installed with SP2.
  8. Inform the application team and have them validate that application is working properly.

**Steps to apply SQL Server 2016 SP2 on AlwaysOn SQL Instances.**

**Note: Before applying SP2, please do below.**

* 1. Issue a full backup of all user and system databases including the Resource database.
  2. Take note of all the Startup parameters of both SQL Primary & SQL Secondary Replica’s.
  3. Extract all SQL Server Logins, DB Permissions, SP\_CONFIGURE details.

Note: **SQL Primary AG Replica**: SQL1

**SQL Secondary AG Replica**: SQL2

1. From the node acting as the primary replica (**SQL1**), change the failover mode to manual.
2. Refresh the affected DB’s on the secondary replica (**SQL2**) & make sure that everything is green on the dashboard.
3. Apply the patch (SP2) on **SQL2**.
4. Repeat the Windows Update and/or software updates until all available patches are applied.

Do not move on with the patching steps until all patches and post patch reboot and configuration tasks are completed.

1. Double check that patches have been applied, the cluster is healthy and AlwaysOn Availability Groups are functional.
2. Make sure that synchronization state is SYNCHRONIZED.
3. Fail over the availability group to the secondary replica (**SQL2**).
4. Refresh the affected databases on secondary Replica (former primary = **SQL1**) until the synchronization state is synchronized.
5. Apply the patch (SP2) on **SQL1**.
6. Repeat the Windows Update and/or software updates until all available patches are applied. Do not move on with the patching steps until all patches and post patch reboot and configuration tasks are completed.
7. Double check that patches have been applied, the cluster is healthy and AlwaysOn Availability Groups are functional.
8. Make sure that synchronization state is SYNCHRONIZED.
9. Fail over the availability group to the primary node (back to **SQL1**).
10. Change the failover mode to Automatic now (which we changed in Step 1)

**Reference link:**

<https://blog.sqlauthority.com/2017/03/04/sql-server-apply-patch-alwayson-availability-group-configuration/>