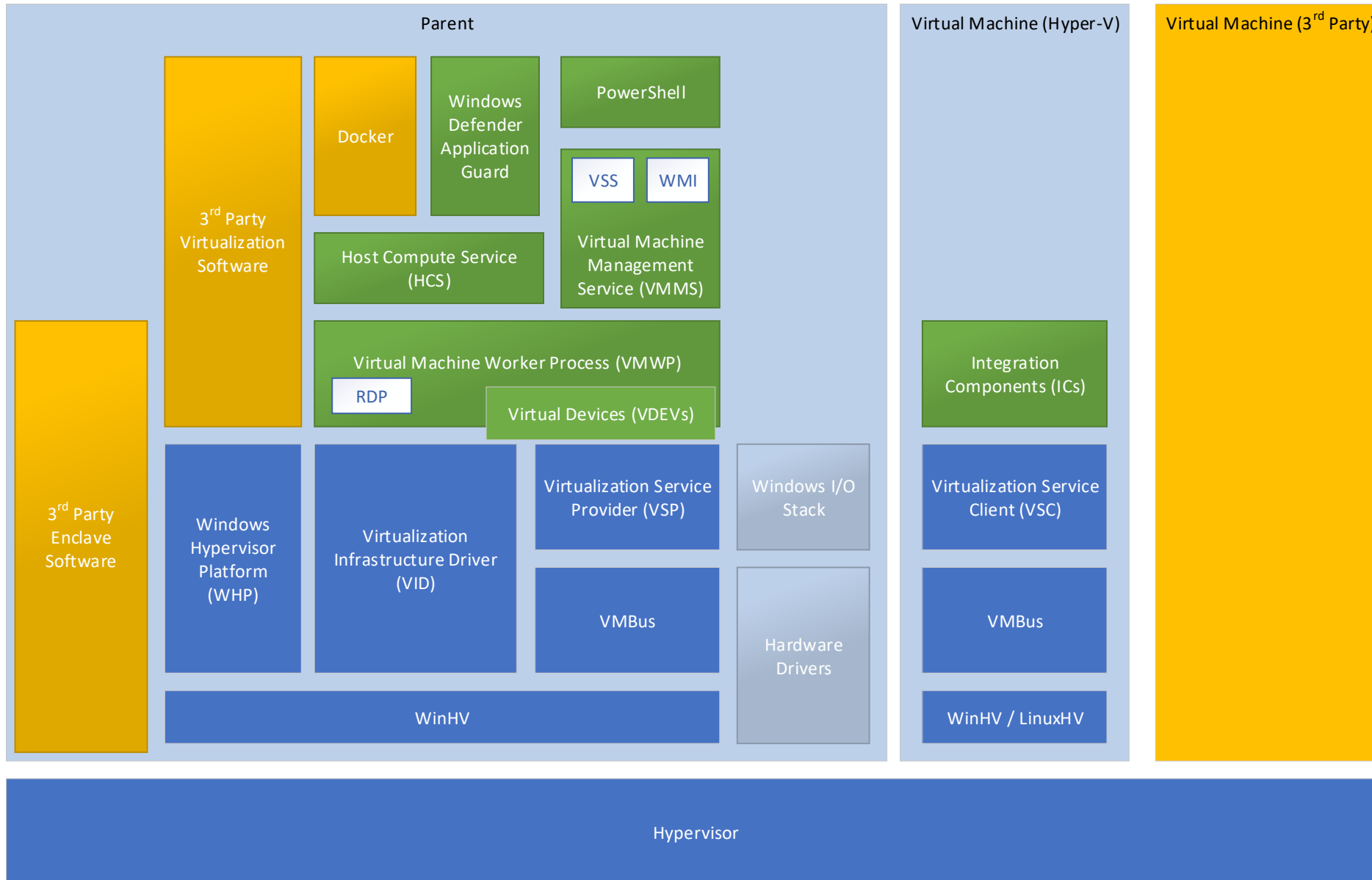


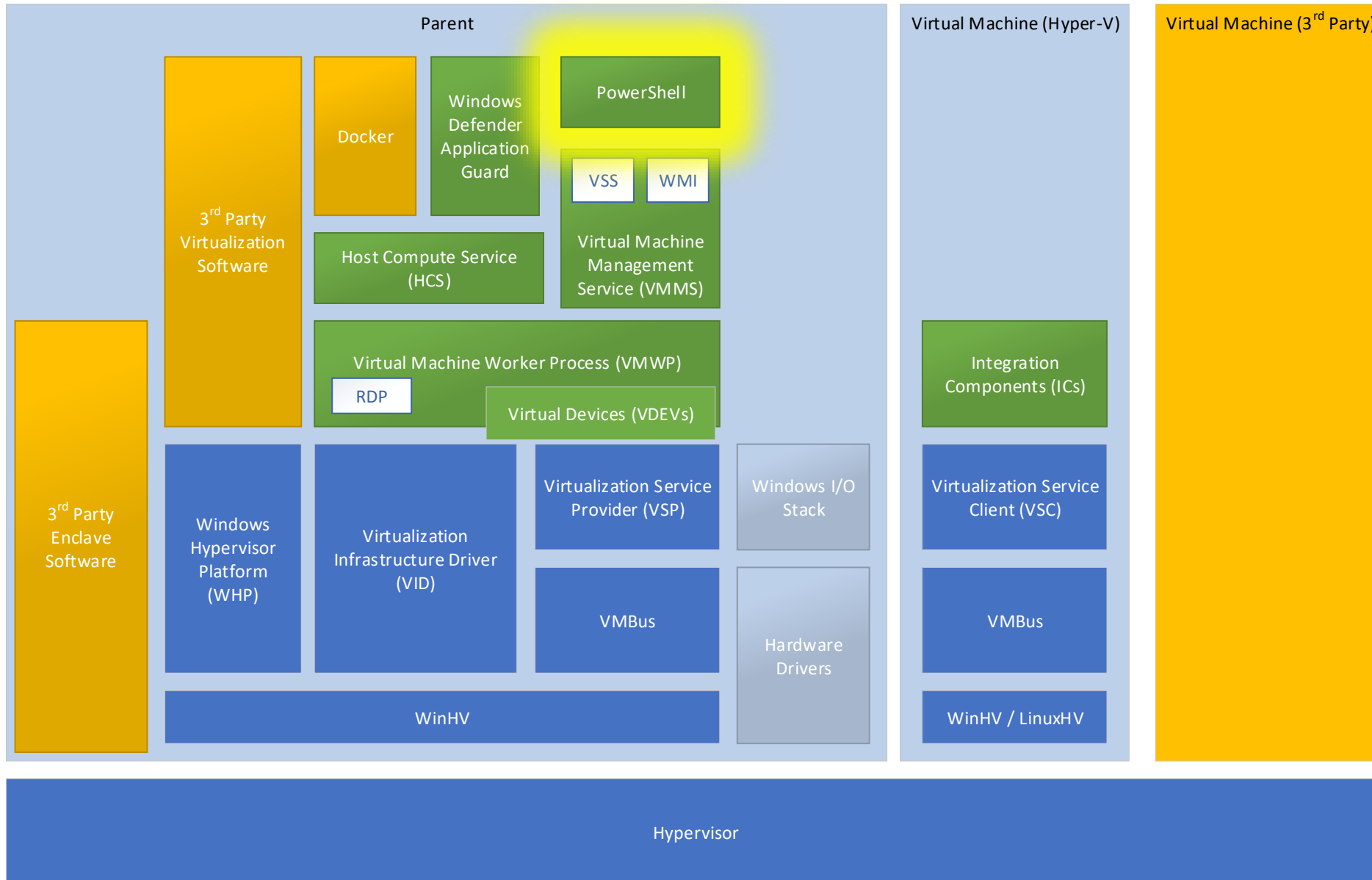
My goal today

- Step you through Hyper-V and give you pointers to all the APIs and extension points

Hyper-V



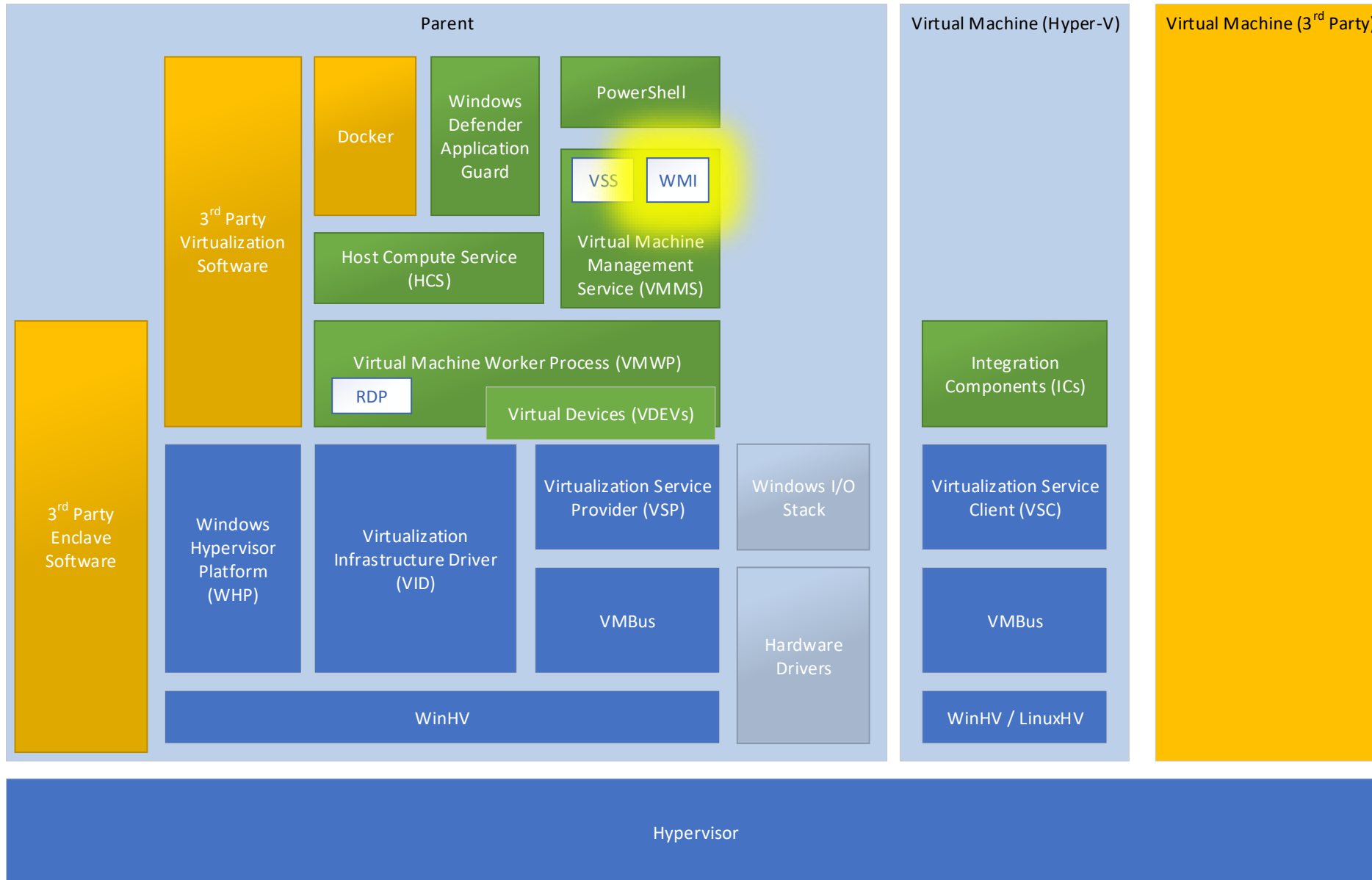
PowerShell



PowerShell

- <https://docs.microsoft.com/en-us/powershell/module/hyper-v/index?view=win10-ps>
- Simple .NET based API for managing Hyper-V
- Designed for usability over performance/parallelism
- Good for prototyping

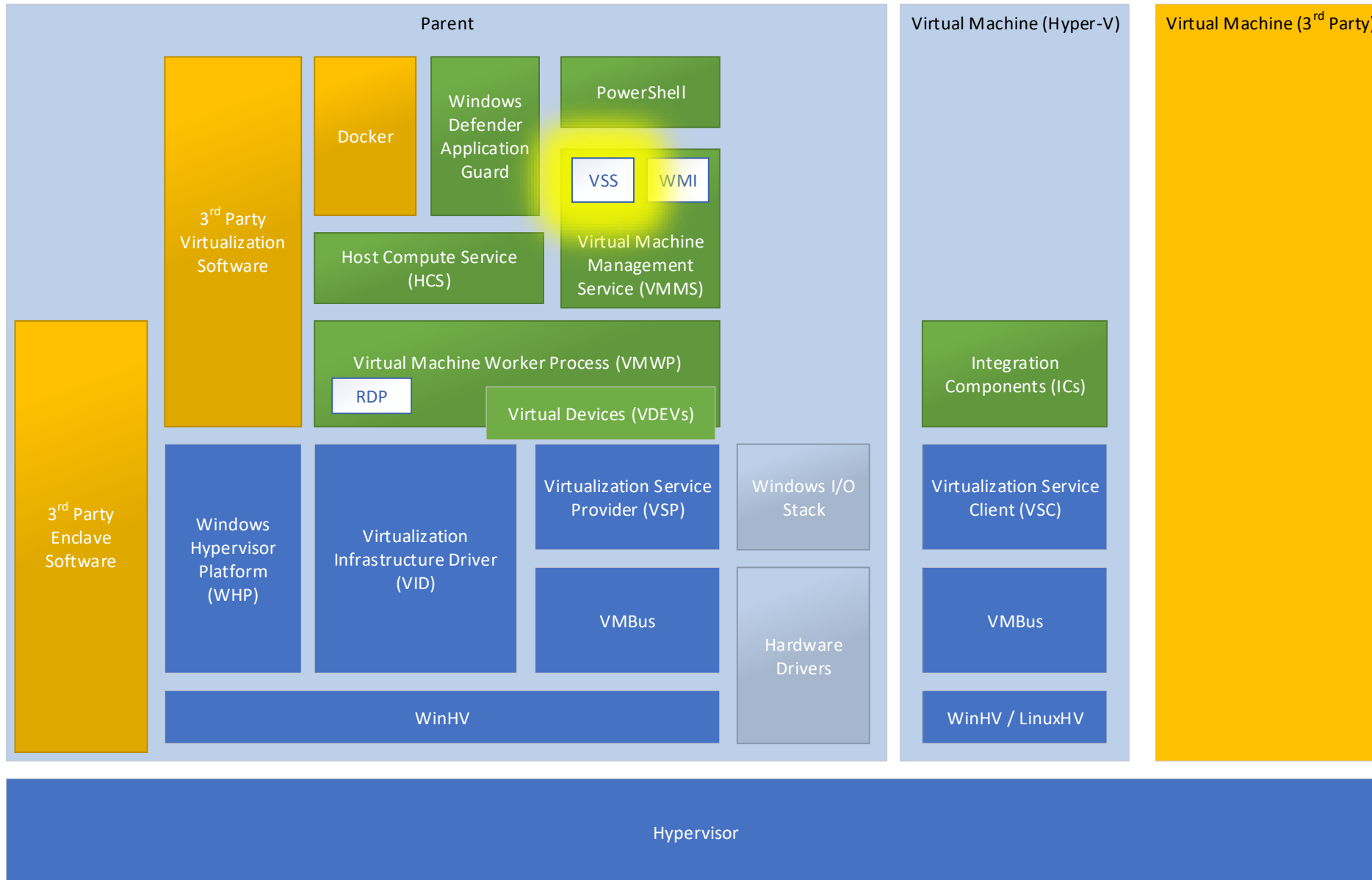
WMI provider (V2)



WMI provider (V2)

- [https://msdn.microsoft.com/en-us/library/hh850319\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/hh850319(v=vs.85).aspx)
- Primary management surface for Hyper-V
- Based on DMTF VMAN standard
- Do not use the V1 interface! (it was removed in 2012 R2)

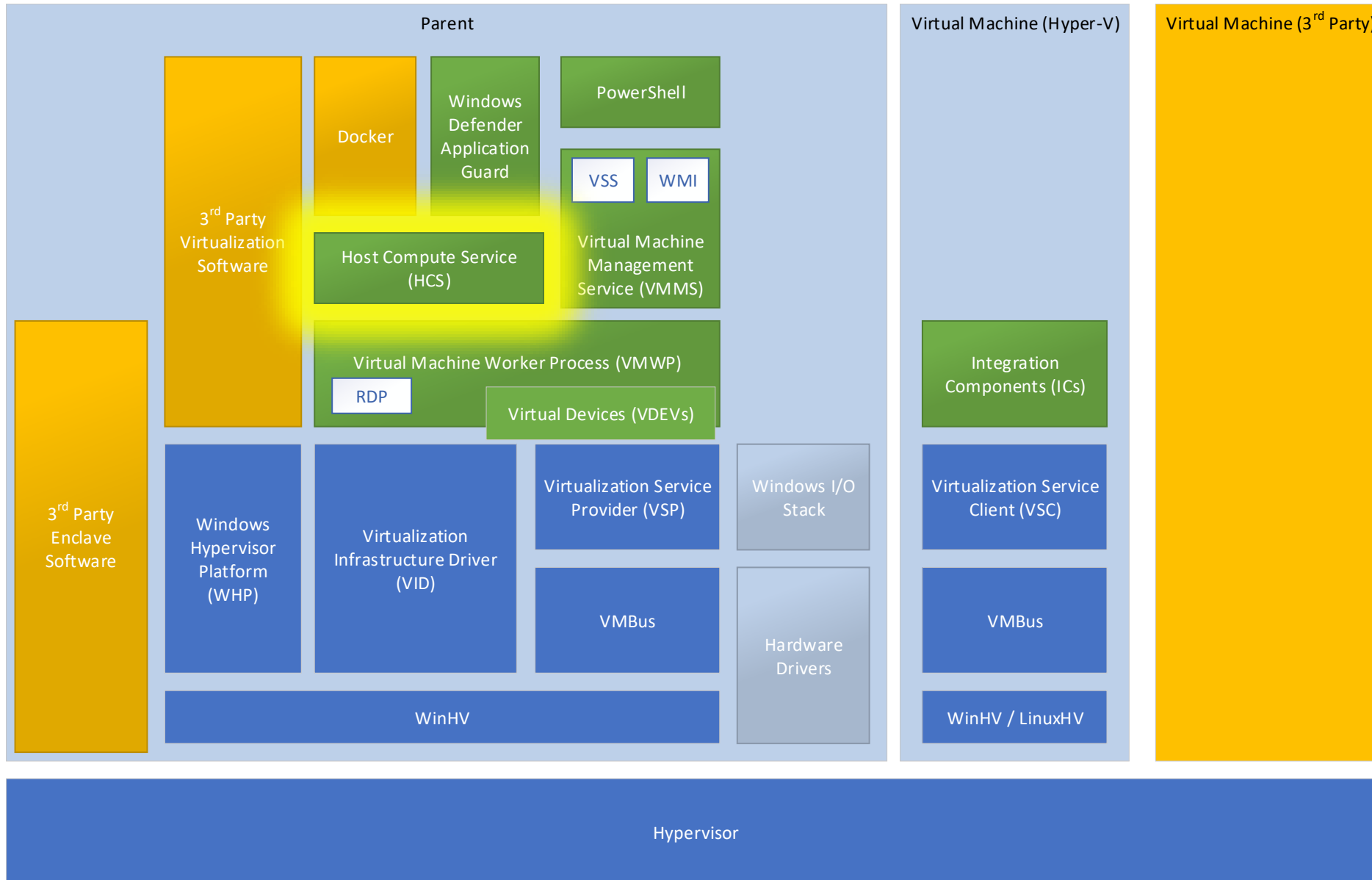
VSS



VSS

- No dedicated documentation for Hyper-V VSS
- Invoke our writer like any other VSS component
- **Optionally – use Hyper-V WMI and Checkpoints to backup virtual machines without using our VSS writer**
 - This still uses our VSS requester and provider inside the virtual machine

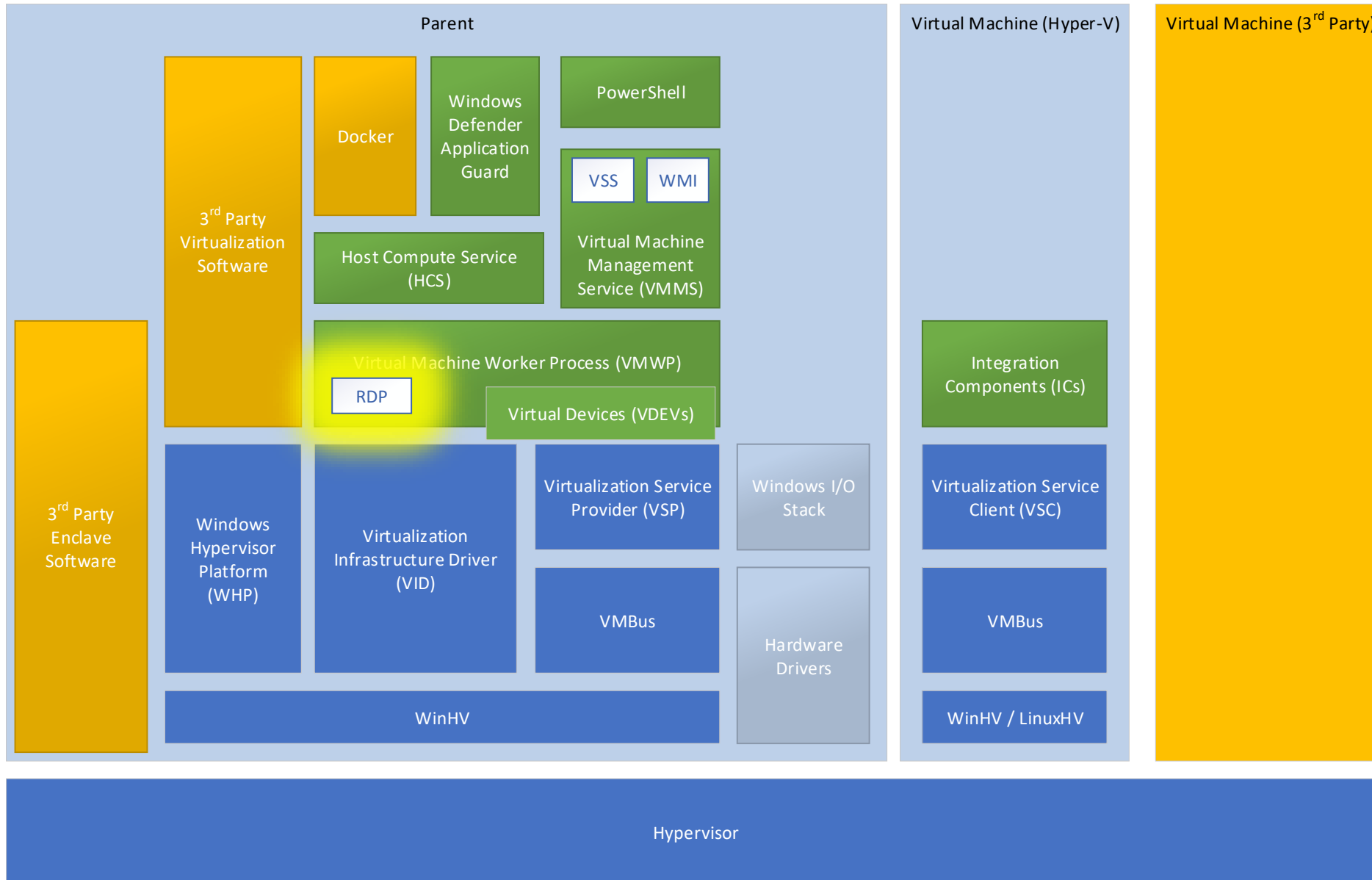
Host Compute Service



Host Compute Service

- Documentation coming soon to <https://docs.microsoft.com/en-us/virtualization/#pivot=main&panel=core>
- New API coming in Windows Server 2019
- Aimed at delivering a simple, lower level API for managing Hyper-V virtual machines and containers

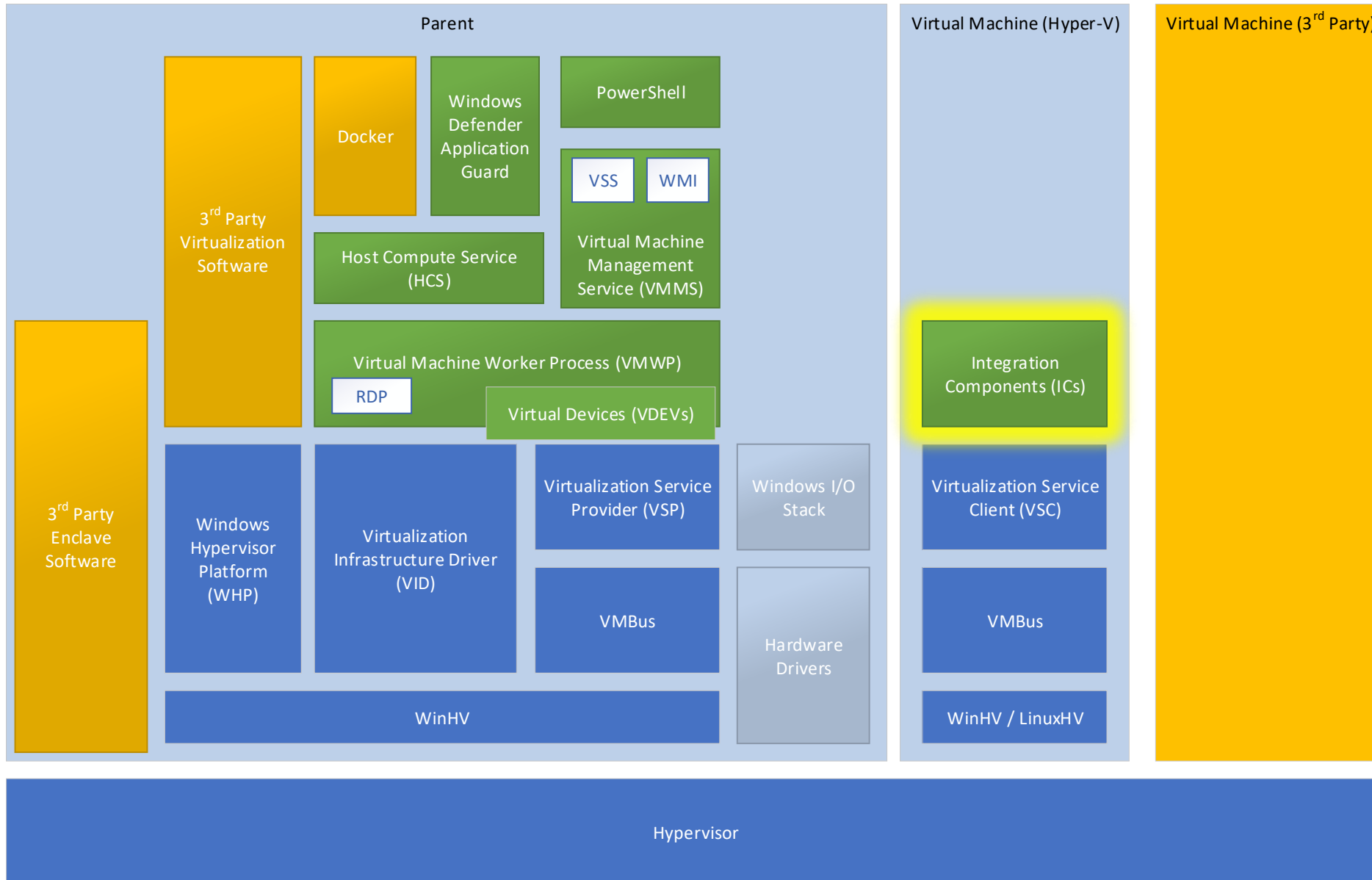
Remote Desktop Protocol



Remote Desktop Protocol

- <https://blogs.msdn.microsoft.com/taylorb/2013/05/02/developing-a-custom-vmconnect-application/>
- Hyper-V virtual machine displays use the standard RDP protocol
- Even for things like the virtual system BIOS display

Hyper-V Socket



Hyper-V Socket

- <https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/user-guide/make-integration-service>
- Starting in Windows 10 Anniversary Update, anyone can make applications that communicate between the Hyper-V host and its virtual machines using Hyper-V sockets -- a Windows Socket with a new address family and specialized endpoint for targeting virtual machines.

VHDX / VHD

- **VHD:** [https://msdn.microsoft.com/en-us/library/windows/desktop/dd323654\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/dd323654(v=vs.85).aspx)
- **VHDX:** <https://msdn.microsoft.com/en-us/library/mt740058.aspx>
- **Both released under the Open Specification promise**

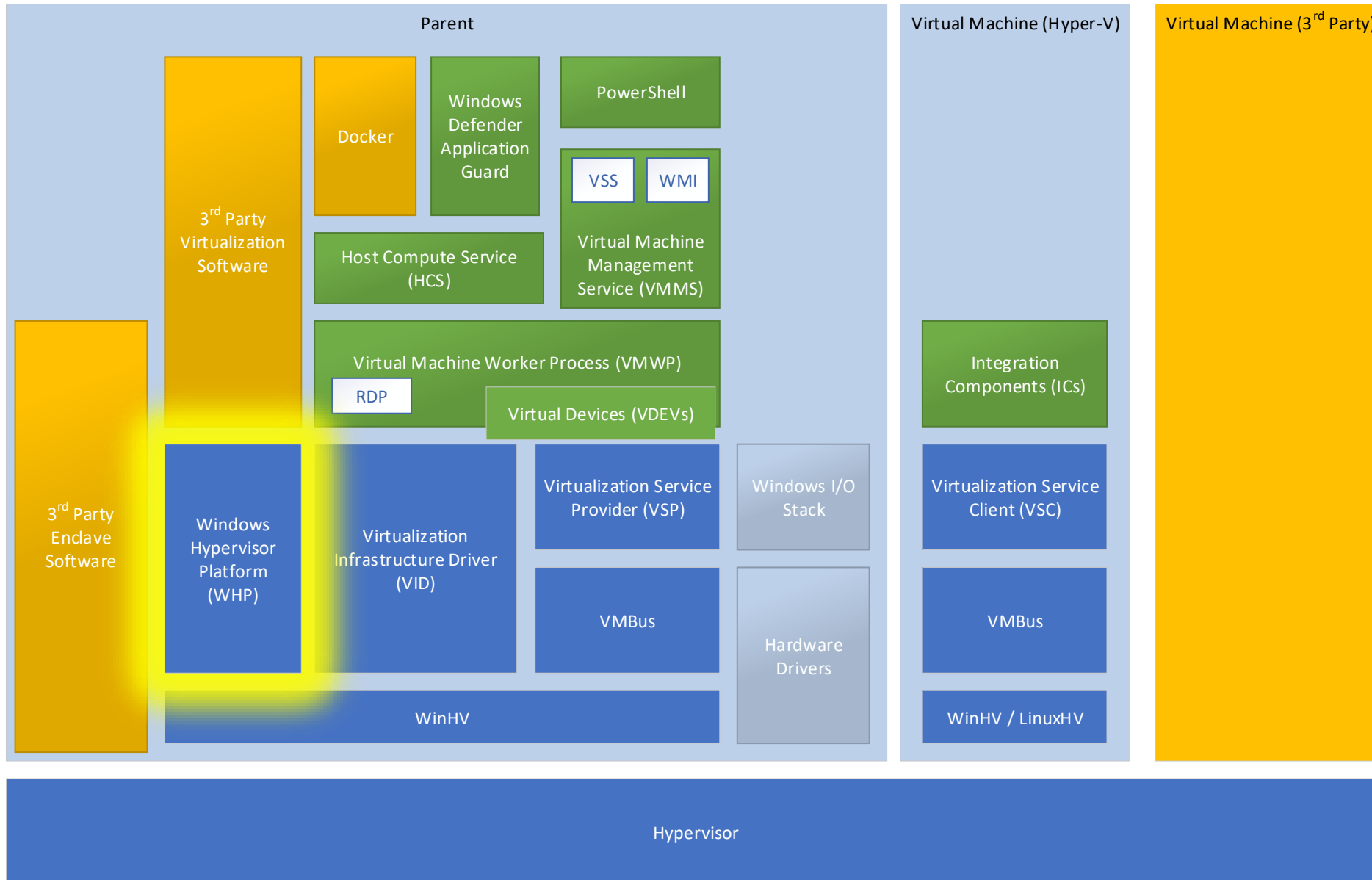
Resilient Change Tracking

- Reference Points: [https://msdn.microsoft.com/en-us/library/mt167904\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/mt167904(v=vs.85).aspx)
- QueryChangesVirtualDisk:
[https://msdn.microsoft.com/en-us/library/windows/desktop/mt162230\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/mt162230(v=vs.85).aspx)
- Enables efficient backup of virtual machines without having to implement a filter driver

Remote Shared Virtual Disk Protocol

- <https://msdn.microsoft.com/en-us/library/dn393384.aspx>
- Specifies the Remote Shared Virtual Disk Protocol, which supports accessing and manipulating virtual disks stored as files on an SMB3 file server.

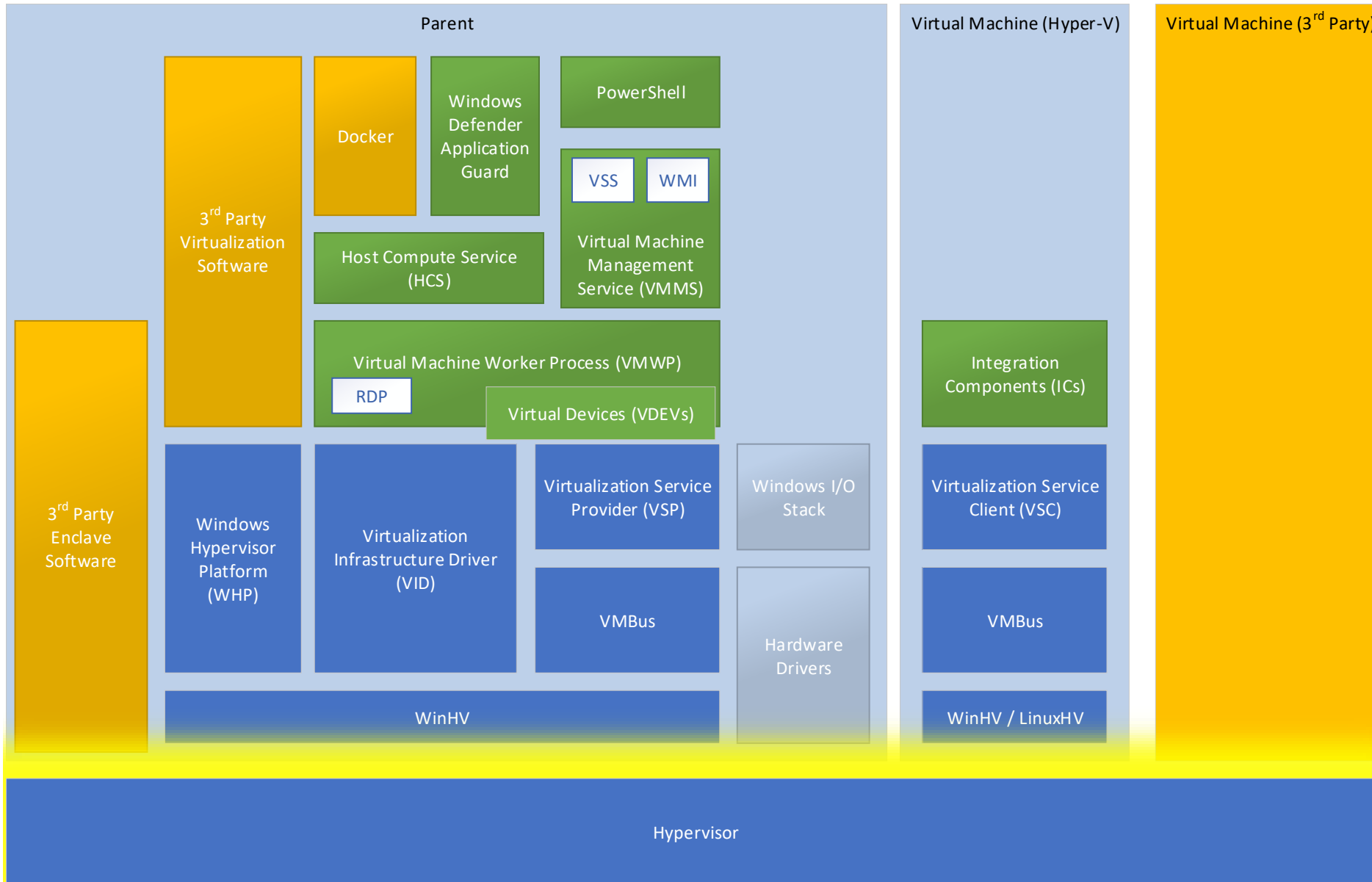
Windows Hypervisor Platform



Windows Hypervisor Platform

- <https://docs.microsoft.com/en-us/virtualization/api/hypervisor-platform/hypervisor-platform>
- The Windows Hypervisor Platform adds an extended user-mode API for third-party virtualization stacks and applications to create and manage partitions at the hypervisor level, configure memory mappings for the partition, and create and control execution of virtual processors.

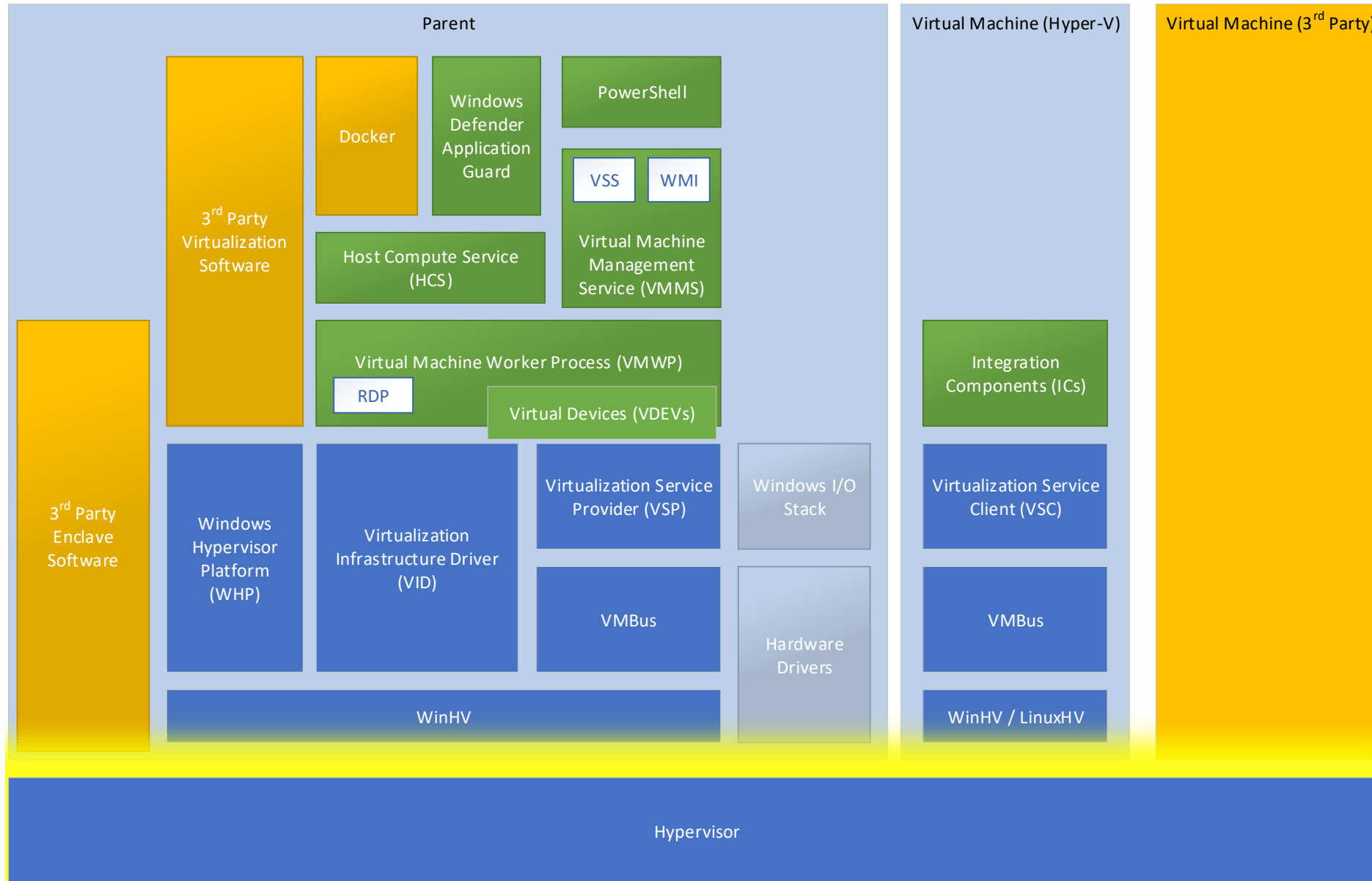
Enclaves



Enclaves

- [https://msdn.microsoft.com/en-us/library/windows/desktop/mt844253\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/mt844253(v=vs.85).aspx)
X
- An enclave is an isolated region of memory within the address space of a user-mode process. This region of memory is controlled entirely by the Windows hypervisor. VBS secure memory enclaves create a means for secure, attestable computation in an otherwise untrusted environment.

Hypervisor TLFS



Hypervisor TLFS

- <https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/reference/tlfs>
- The Hyper-V Hypervisor Top-Level Functional Specification (TLFS) describes the hypervisor's externally visible behavior to other operating system components. This specification is meant to be useful for guest operating system developers.

