Acronyms

AD DS
Active Directory Domain Services
API
Application Programming Interface
CID
Confirmation ID
CIL
Computer Information List
CMID
Client Machine ID
DDNS
Dynamic DNS
DNS
Domain Name System
DMZ
Demilitarized zone
IID
Installation ID
KMS
Key Management Service
MAK
Multiple Activation Key
MVLS
Microsoft Volume Licensing Services
OOB
Out-of-Box
OOT
Out-of-Tolerance
OS
Operating System
PKey
Product Key
SA
Software Assurance
SRV
DNS Service Record
VLSC
Volume License Service Center
SP
Service Pack
VAMT
Volume Activation Management Tool
VPN
Virtual Private Network
VL
Volume License
WAN
Wide Area Network
WGA
Windows Genuine Advantage
WMI
Windows Management Instrumentation
XML
Extensible Markup Language

Volume License Basics

Volume Licensing

- VL offering for Windows Vista® is an upgrade license and requires a qualifying Windows® client operating system.
- With VL media, no product key is required during setup.
- To create bootable images download the media from VLSC.
- VL customers (By default) get upgrade media for Windows Vista.
- Windows Vista Ultimate is available for VL customers only as an SA benefit. Cannot activate via KMS or MAK; retail keys provided for Windows Vista Ultimate via SA Call Center.

For more information:
http://www.microsoft.com/licensing

Volume Licensing Service Center (VLSC)

- VLSC provides management of VL agreements, download licensed products, and accessing of product keys.
- VLSC allows viewing of Microsoft License Statements and reporting of VL entitlements.
- VLSC is the replacement for eOpen and MVLS sites.
- For more information:
https://licensing.microsoft.com/eLicense

Volume Activation 2.0 Key Management

Product Keys and Its Applicability

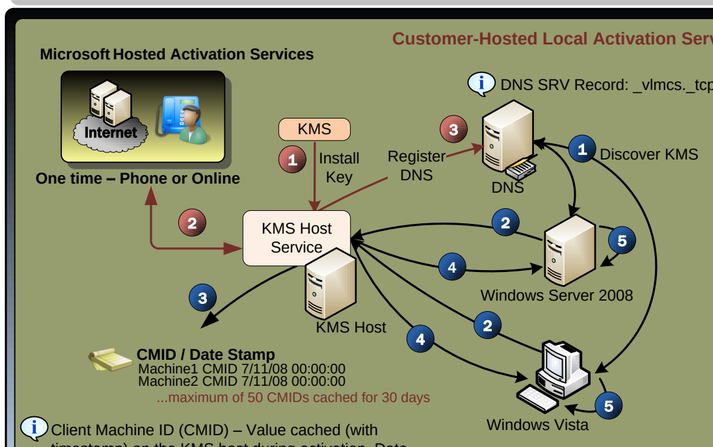
- Customers receive 1 MAK per group and 1 KMS per group.
- KMS keys are hierarchical while MAK can only activate Windows editions within the group.
- KMS hosted on Windows Server 2003 and Windows Server 2008 can activate all Windows Vista and Windows Server 2008 editions (dependent on the KMS key that is used).
- KMS Host on Windows Vista can only activate Windows Vista.
- Request additional activations on an organization's MAK or KMS key by calling the Product Activation Call Center (http://www.microsoft.com/licensing/resources/vol/numbers.aspx).
- Product keys can also be replaced if they have been compromised (i.e. leaked to unauthorized personnel).

Product Group	Which Products are Activated			
	Client VL	A	B	C
Product Group Client VL: Windows Vista Business, Windows Vista Enterprise	KMS MAK			
Product Group A Windows Web Server 2008	KMS	KMS MAK		
Product Group B Windows Server 2008 Standard, Windows Server 2008 Enterprise*	KMS	KMS	KMS MAK	
Product Group C: Windows Server 2008 Datacenter*, Windows Server 2008 for Itanium-based Systems	KMS	KMS	KMS	KMS MAK

*Includes editions without Hyper-V.

Key Management Service (KMS)

Customer-Hosted Local Activation Service



Client Machine ID (CMID) – Value cached (with timestamp) on the KMS host during activation. Date is updated on client renewal.

KMS Activation Threshold Examples

KMS requires a minimum number of computers in a network environment, called the activation threshold, to activate KMS client machines. Activation threshold for Windows Vista is twenty-five physical computers. For Windows Server 2008 it is five physical computers.

Windows Server 2008	Windows Vista	KMS Host	Activation Count On KMS Host	KMS Activation Status
4	1	1	5	Windows Server 2008 Only
1	4	1	5	Windows Server 2008 Only
1	1	1	2	None
4	22	1	26	Both

Understanding the KMS Activation Process

KMS Host Setup

1. Install "KMS" key on KMS Host using SLMGR Command.
2. KMS host is activated with the KMS key using Microsoft's Hosted Activation Services.
3. KMS Service registers SRV resource records in DNS each time KMS Service is started.

KMS Client interaction with KMS Host

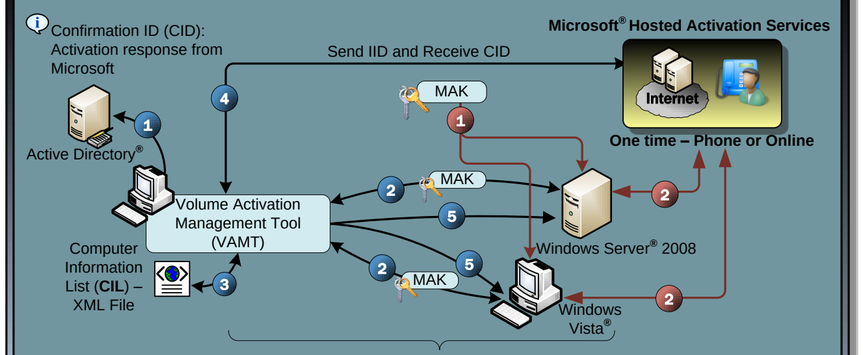
1. Discover KMS host using registry entry. If no entry then query DNS for KMS SRV record.
2. Send RPC request to KMS host on 1688/TCP by default (~250b).
   - Generate client machine ID (CMID).
   - Assemble and sign request (AES encryption).
   - On failure, retry (2 hours for machine in Grace, 7 days for (KMS) activated machine).
3. KMS host adds CMID to table.
4. KMS host returns activation count to client.
5. KMS client evaluates count vs. license policy and activates itself if the activation threshold is met.
   - Store KMS host Product ID, intervals, and client hardware ID in license store.
   - On success automatically attempt to renew activation every 7 days (default).

KMS Reference Information

- Default activation method for volume builds of Windows Vista and Windows Server 2008.
- Each KMS key can activate 6 KMS hosts up to 10 times each.
- Each KMS host enables unlimited number of activations.
- KMS clients are activated for 180 days.
- Configurable parameters (KMS host) are Renewal Interval (7d), Retry Interval (2h), and Port (1688) KMS is autonomous (no replication of data between hosts).
- KMS activation threshold is cumulative between OS types.

Multiple Activation Key (MAK)

One-time Activation with Microsoft's Hosted Activation Services



CIL XML file saved with VAMT containing computers, MAK keys, CIDs, and other machine information used during activation.

Remote WMI (local admin required)
Firewall – exception, Local subnet (default)

Understanding the MAK Activation Process

MAK Independent Activation

1. Distribute MAK using VAMT, as part of an image, using change product key wizard or using a WMI script.
2. MAK client(s) connect once to Microsoft via Internet (SSL) for activation or use telephone. Significant hardware changes will require reactivation.

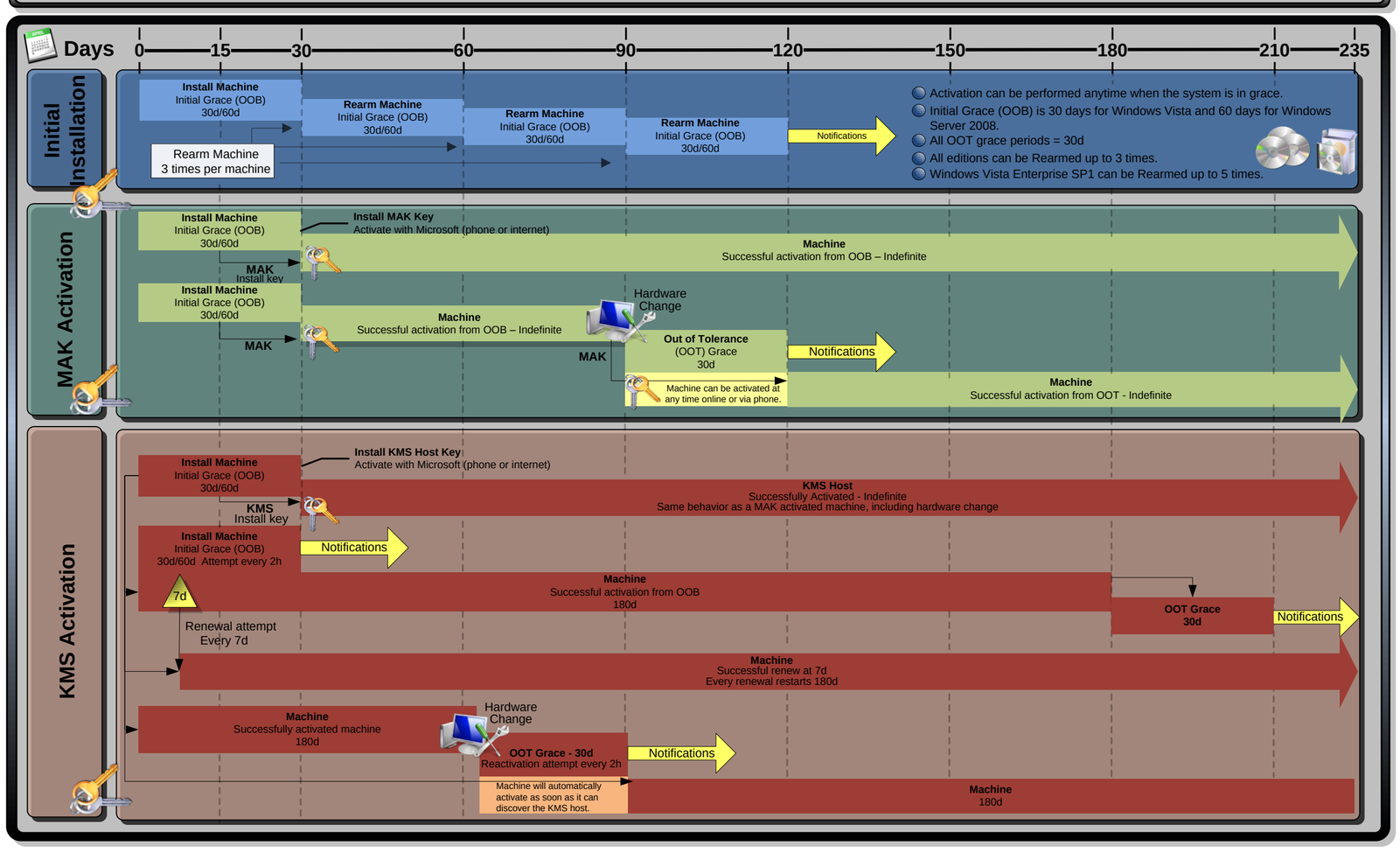
MAK Proxy Using VAMT

1. Find machine(s) from Microsoft Active Directory or through network discovery APIs.
2. Apply MAK and collect Installation ID (IID) using WMI.
3. Optionally export machine information to XML file (Computer Information List - CIL).
4. Connect to Microsoft over Internet (SSL) and obtain corresponding Confirmation ID (CID). Optionally update CIL XML file with CIDs.
5. Activate MAK Proxy client(s) by applying CID (optionally import updated XML file first). Significant hardware changes will require reactivation.

MAK Reference Information

- The Multiple Activation Key (MAK) is used for one-time perpetual activation with Microsoft's hosted activation services. MAK Independent activation is via phone or online.
- Each MAK has a predetermined number of allowed activations, based on an organization's volume license agreement.
- MAK Proxy activation (VAMT)
  - x86, English Only.
  - Windows® XP SP2 or greater, Windows Vista, Windows Server 2003, and Windows Server 2008.

Microsoft Windows Volume Activation 2.0 Timeline

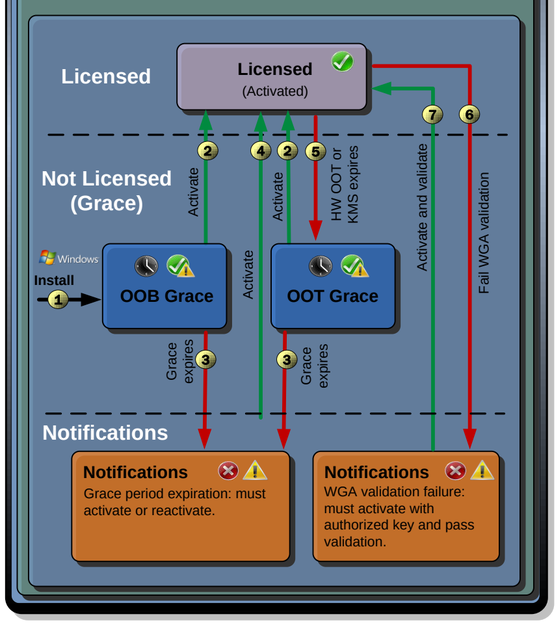


Volume Activation 2.0 License States

Windows Activation 2.0 Operation

A Windows Vista or Windows Server 2008 machine can be in one of 3 states: Grace, Licensed, or Notifications.

1. Machine is in Out-Of-Box (OOB) grace after initial installation.
2. To activate, install a product key (MAK) and activate online/via phone or discover a KMS host (KMS) and activate over the network.
3. If a machine fails to activate (or reactivate with KMS) then it will transition to Notifications.
4. A machine can transition from Notifications to Licensed by following Step 2.
5. For significant hardware changes the machine may fall Out-of-Tolerance (OOT) and enter grace. A machine can transition from grace by activating (Step 2).
6. If a machine fails an online validation then it will transition to Notifications.
7. Activate by following Step 2 and validate (http://www.microsoft.com/genuine) to transition from Notifications to Licensed.



Planning for Activation

KMS is the recommended activation method for computers that are well connected to the organization's core network or that have periodic connectivity. MAK activation is the recommended activation method for computers that are offsite with limited connectivity or that cannot connect to the core network, even intermittently.

Determine activation methods by assessing how different groups of computers connect to the network

Infrastructure Options	Recomendations
Core Connected LAN Most common scenario	If physical machines ≥ KMS activation threshold: Small organization (<100 machines): KMS host = 1 Medium organization (>100 machines): KMS host ≥ 1 Enterprise: KMS host > 1 If physical machines ≤ KMS activation threshold: MAK (phone or internet) MAK Proxy
Secure Branch office, secure network segment, DMZ Well-connected LAN, zoned	If firewalls can be opened between clients and existing KMS host: Use KMS host(s) in Core network If policy prevents firewall modification: If physical machines ≥ KMS activation threshold, use a local KMS host MAK (phone or internet) or MAK Proxy
Isolated Isolated, Lab/Development, or Short Term Use	If physical machines ≥ KMS activation threshold: KMS host = 1 (per isolated network) If physical machines ≤ KMS activation threshold: No activation (rearm) MAK (phone) MAK Proxy (Sneakernet)
Roaming Or Disconnected No connectivity to the internet/Core Roaming machines connect periodically at Core or via VPN	For clients that connect periodically to Core: Use the KMS host(s) in Core network For clients that never connect to Core or have no internet access: MAK (phone) For air-gapped networks: If physical machines ≥ KMS activation threshold, Small organization: KMS host = 1 Medium organization: KMS host ≥ 1 Enterprise: KMS host > 1 If physical machines ≤ KMS activation threshold, MAK or MAK Proxy (Sneakernet)

Ethernet
Core KMS Host

Deployment and Management

Volume Activation 2.0 Resources

Resources

- Microsoft Volume Activation
  http://www.microsoft.com/technet/volumeactivation

Tools

- Volume Activation Management Tool (VAMT)
  http://go.microsoft.com/fwlink/?LinkID=77533
- KMS host on Windows Server 2003
  http://go.microsoft.com/fwlink/?LinkID=82964
- KMS Management Pack for System Center Operations Manager 2005
  http://go.microsoft.com/fwlink/?LinkId=110332

Monitoring and Management Tools

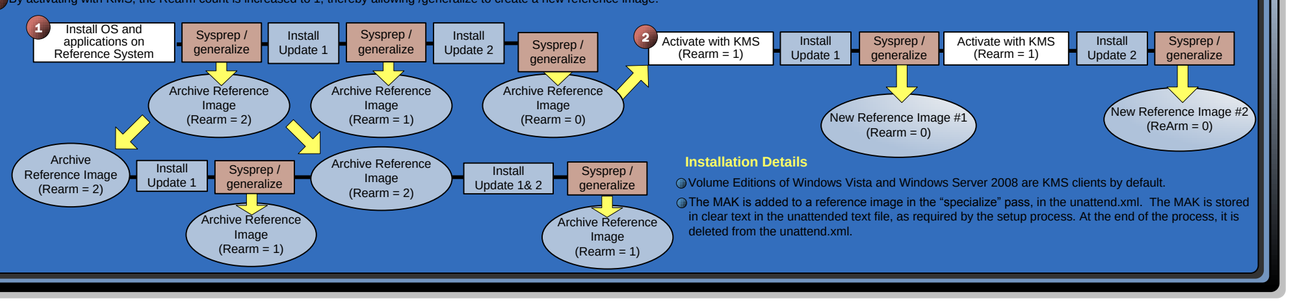
Tools to monitor and manage the activation status of volume license editions of Windows Vista and Windows Server 2008.

Management Option	Activation Methods	Notes
Built in capabilities	All	SLMGR VBS WMI Interface Event Logs Public APIs
Volume Activation Management Tool (VAMT)	MAK / MAK Proxy	Discovery via AD DS , Workgroup, IP or machine name Proxy Activate 1 or more machines with Microsoft Cache CIDs and reapply to rebuild/reimage hardware
Microsoft Operations Manager 2005 (MOM)	KMS	KMS MOM Pack (http://go.microsoft.com/fwlink/?linkid=83216) Event Reporting and activation monitoring
Microsoft Systems Management Server (SMS) SP3	MAK and KMS	Collect and report activation client data

Volume Activation 2.0 Image Management

The following process diagram explains how to manage image creation and the Rearm count. Rearm is used to reset the activation timer (back to OOB Grace).

1. The /generalize parameter for Sysprep.exe resets the activation timer, security identifier, and other important parameters. Resetting the activation timer prevents the image's grace period from expiring before the image is deployed. Each time /generalized is used, the Rearm count is reduced by one. Once a system has a Rearm=0, /generalize may not longer be used to create a reference image.
2. By activating with KMS, the Rearm count is increased to 1, thereby allowing /generalize to create a new reference image.



Installation Details

- Volume Editions of Windows Vista and Windows Server 2008 are KMS clients by default.
- The MAK is added to a reference image in the "specialize" pass, in the unattend.xml. The MAK is stored in clear text in the unattended text file, as required by the setup process. At the end of the process, it is deleted from the unattend.xml.

Microsoft Windows Volume Activation 2.0 Reference Guide

More information is available on the Volume Activation 2.0 Center on TechNet at
http://www.microsoft.com/technet/volumeactivation

More information is available at TechNet Vista Springboard
http://www.microsoft.com/springboard