

INDEX

Note to the reader: Throughout this index **boldfaced** page numbers indicate primary discussions of a topic. *Italicized* page numbers indicate illustrations.

Symbols and Numerals

#endregion directive, 705
#region directive, 705
#requires directive, 711
#TYPE, in CSV file, omitting, 453
\$Error variable, 518
\$global:defaultvi servers variable, 654
_Task suffix, for methods, 602
` (backtick), as PowerShell escape character, 580
20-second interval, 468

A

abstraction, 50
abstraction layer, in guest customizations, 184–185
AccountRemovedEvent event, 511
accounts, preventing inclusion in Onyx information collection, 629, 629
Action property
 of alarm object, 504
 for backup, 329
 for log backup, 330
action scripts, accessing vSphere objects in, 517
ActionFrequency property, of alarm object, 504
actions
 of alarm object, **513**
 in vEcoShell, 641, **642–646**, 644
Active Block Mapping, in vRanger, 316
Active Directory, configuring integration, 120–126
Active Directory PowerPack, 637
Add-BackupGroupEntity cmdlet, 318
Add-BackupJobTemplate cmdlet, 318
Add-CifsRepository cmdlet, 318
Add-Datastore wizard, 42–43, 43
Add-DistributedSwitchVMHost function, 100, 102
Add-FtpRepository cmdlet, 318
Add-Managed Host action, 639
Add-Member cmdlet, 350, 351, 352, 450–451, 452
Add-New Role dialog, 20
Add-NfsRepository cmdlet, 318
Add-PassthroughDevice cmdlet, 221
Add-PSSnapin cmdlet, 573
Add-PSSnapin VMware-VumAutomation command, 405
Add-ReplicationJobTemplate cmdlet, 318
Add-RestorefromManifestJobTemplate cmdlet, 318
Add-RestoreJobTemplate cmdlet, 318
Add-S3Repository cmdlet, 318
Add-SftpRepository cmdlet, 318
Add-Type cmdlet, 453
Add-VBRBackupJob cmdlet, 321
Add-VBRCopyJob cmdlet, 321
Add-VBRESX cmdlet, 321
Add-VBRESXi cmdlet, 321
Add-VBRJobObject cmdlet, 321
Add-VBRLinux cmdlet, 321
Add-VBRReplicaJob cmdlet, 321
Add-VBRvCenter cmdlet, 321
Add-VirtualAppforLinuxFLR cmdlet, 318
Add-VMHost cmdlet, 356–357
Add-VmHostNtpServer cmdlet, 61
Add-VSBApplicationGroup cmdlet, 321
Add-VSBJob cmdlet, 321
Add-VSBVirtualLab cmdlet, 321
addDataSet activity, 679, 679
Admin Script Editor (iTripoli), 690
administrative tasks, VMware PowerPack for, **650–652**, 651
Administrator account, on Windows servers, renaming, 238–240
agent scheduling, for workflows, 670
aggregated data, from vCenter Server, 464
aggregation process
 jobs, 466
 for statistical data, 464
alarm managed objects, properties, 503–504
alarm script
 appending errors to log file, 517–518
 capturing execution, 515
 complete code, 519–520

alarms, **503–528**

- actions, **504–505, 513**
 - confirming firing of SNMP trap, **589–590**
 - designing, **503–524**
 - email action, **520**
 - event alarms, **506–511**
 - expressions, **505–506**
 - firing mechanisms, **505**
 - general creation function, **520–524, 521**
 - guest custom attribute change, **523–524**
 - guest network connectivity, **522–523**
 - metric alarms, **512**
 - modifying, **525–526**
 - moving, **526–528**
 - removing, **524–525**
 - schematic, **504**
 - script actions, **513–520**
 - state alarms, **512**
 - yellow CPU usage, **521–522**
- AlarmTriggeringAction, **503**
- AllSigned policy, **576**
- AndAlarmExpression, **505**
- anti-aliasing, **698**
- API Reference. *See* vSphere API Reference
- applications, maintaining updates, **404**
- Apply-VMHostProfile function, **53**
- Approve-SRMPlanPrompt function, **312**
- arguments, and scheduling scripts, **574–575**
- Assert-NAR01 function, **395–396**
- Assert-NCN03 function, **397**
- Assert-VMX01 function, **371–373**
- Assign Permissions wizard, **15, 16**
 - roles listed in, **19, 19**
- AssignTo property, **676, 677**
- associating host profiles, **118–119**
- associative arrays, **433**
- asynchronous mass deployment, **152–154**
- asynchronous task
 - error handling after, **619**
 - waiting for, **618**
- at command (Windows), **570**
- Attach-Baseline cmdlet, **411**
- attachments, emailing report as, **462**
- attributes, custom, **157–163**
 - backup to notes, **159–161**
 - Created by/On custom attribute, **158**
 - restoring from notes, **161–162**
 - VM last modified by, **158**
- Attributes property, of alarm object, **511**
- auditing
 - identifying eye-catchers for, **157–163**
 - reports, **530**
- automated installation, requirements, **4–5**
- Autopart command, Partition tab, **39–40, 40**

- AvailableField property, of data objects, **600**
- average, for vSphere statistics, **471**

B

- backtick (`), as PowerShell escape character, **580**
- backup
 - do-it-yourself
 - creating, **304–307**
 - disk space for, **307**
 - restoring VMs from, **307–308**
 - PowerShell support for corporate applications, **315–323**
 - Quest, **316–320**
 - Veeam, **320–323**
 - protecting, **326**
 - vs. snapshots, **256**
 - of vCenter Server, **326–336**
 - of vCenter Server configuration, **333–336**
 - of vCenter Server database, **327–333**
 - differential backup, **330**
 - full backup, **328–329**
 - log backup, **330**
 - Backup-MsSqlDatabase function, **330–333**
 - backup traffic, separating from normal data traffic, **205**
 - Backup-VcConfig function, **334–336**
 - base class, finding events derived from, **534–535**
 - base definition for task, default values to create, **578**
 - baselines, **406–412**
 - attaching and detaching, **411–412**
 - creating, **406–410**
 - implementing compliance, **422–424**
 - updating, **410–411**
 - bash script, for installing VMware Tools, **165–166**
 - batch file command, for recovery plans, **314**
 - batch scripts, format, **248**
 - Berc, Lance, **63**
 - blank form, code to display, **691–692**
 - blank virtual machines, mass deployment, **151**
 - blue folders, **8, 347, 352**
 - Body parameter, for HTML report, **459**
 - boot delay, changing for VM, **611, 611–612**
 - boot volume, initial size of, **223**
 - Brundage, James, **576**
 - BusyBox/Python, **37**
 - buttons, on forms, **692–695, 693, 694**

C

- calculated properties, for output, **422**
- call stack, in PowerWF Studio editor, **667**
- “Cannot complete login due to an incorrect user name or password” error, **340–341**
- canonical name, **71**

- captured SOAP traffic, translating with Onyx Project, **626**, **626**
- capturing event in form, **694**
- CBT (change block tracking), **254**, **308–311**
 - checking status, **309**
 - enabling/disabling, **309–311**
- cCenter Client, adding to install script, **7**
- CD drive, for virtual machine, **220**
- CD/DVD, for installing vSphere Hypervisor, **36**
- chaining cmdlets, **132**
- Challenge Handshake Authentication Protocol (CHAP), **69**
 - authentication for iSCSI traffic, **375**
- change block tracking (CBT), **254**, **308–311**
 - checking status, **309**
 - enabling/disabling, **309–311**
- ChangeOwnerOfFileEvent event, **510**
- changes, tracking, **530**
- check boxes, adding to form, **699–701**, **701**
- CheckBox-Changed function, **700–701**
- CheckBox control, **699–701**, **701**
- CheckMigrate_Task method, **592–594**, **593**
- CheckRelocate_Task method, **594**, **595**
- CheckTestType, **592**, **593**, **594**
- Cisco Discovery Protocol, extracting information from ESX(i) host, **79**
- Class parameter, for Get-WMIOBJECT cmdlet, **236**
- Clearpart command, **40**
- clients, Onyx to start, **623**, **625**
- cloning
 - snapshot information, **305**
 - vApps, **272–273**
 - virtual machines, **136–137**
 - to template, **179**
- Cluster link
 - in vEcoShell, actions, **644**
 - in vEcoShell console, **642**
 - host objects returned, **643**
- clusters
 - configuring, **26–31**
 - creating, **27**, **355–356**
 - enabling DPM on, **116**
 - enabling FT logging across, **104**
 - exporting, **349–350**
 - making changes using host profiles, **120**
 - MoRef (managed object reference) of, ExtensionData property of, **608**
 - Onyx project reference to, **633**
 - remediating hosts in, **414–415**
 - reports on, **445–450**
 - script for report on all vMotions in, **552–554**
 - slot information, **655–656**, **656**
 - summary report, **446–448**
- Clusters node, in vEcoShell, displaying, **640**, **641**
- cmd history, in PowerWF Studio editor, **667**
- cmd results, in PowerWF Studio editor, **667**
- cmd.exe
 - running scripts, **572**
 - using console file, **574**
- cmdlets
 - availability issues, **573**
 - chaining, **132**
 - format of console output, **421**
 - PowerWF Studio discovery of, **664**
 - renaming, **684**
 - statistical data gathering with, **483**
 - workflows deployed as, **669**, **670**
- C#.NET 2.0, Onyx project output for, **631**
- code parameter objects, in vSphere API, **609–610**
- collapsing regions in scripts, **705**
- collection intervals, **465**
- collectors, **544**
 - fitting into script, **544–550**
- colors, changing for Onyx, **628**
- comma-separated variable (CSV) files. *See* CSV files
- command-line method
 - parameters for script from, **574**
 - for scheduled task creation, **570**
- communities, configuring, **62**
- comparisons property, for event alarm, **510–511**
- compatibility, testing host for, **97**
- complex virtual machine, creating, **135–136**
- compliance data, for hosts, **412–413**
- Computer parameter, for Get-WMIOBJECT cmdlet, **236**
- configuration file, of virtual machines, moving, **254**
- Configure DRS action, properties, **647**
- ConfigureVMHost function, **50–52**
- congestion threshold, **112**
- Connect-SRMSEvent function, **312**
- Connect-VIEvent cmdlet, **518**, **625**
- Connect-VMHost function, **341–344**
- Connect-VSBVirtualLab cmdlet, **321**
- connectVSEvent activity, **672**, **672**, **675**
- console application
 - workflow deployed as, **669**
 - for workflows, **674**
- console file, **514**
 - running scripts from cmd.exe using, **574**
- container in Windows Forms, **690**
- Content area, in vSphere API Reference, **587**
- Content property, of ServiceInstance managed object, **603**
- Control Panel (Windows), Scheduled Tasks, **570**
- controls, adding to form, **692–695**, **693**, **694**
- Converter extension, **542**
- converting
 - PNG file to ICO file, **658**
 - VM to template, **179**
- ConvertTo-HTML cmdlet, **459**

- Copy-HostNetworking function, 87–88
- Copy-Item cmdlet, 334
- Copy-VBRJob cmdlet, 321
- Copy-VMGuestFile cmdlet, 246
- copying, network configuration from another host, **86–89**
- Create a Task action, for alarm object, 504
- Create Basic Task wizard, 575, 575
- Created by/On custom attribute, for virtual machine, 158
- Created property, of snapshot files, 435–436
- CreateTime property, of TaskEvent object, 535
- credential dialog box, custom, 357
- credential management, PowerCLI for, 176
- Credential Request dialog box, 356
- CssUri parameter, for HTML report, 461
- CSV files
 - for alarm trigger information, 506
 - for baseline details, 409
 - for converting text to PowerShell objects, 246–247
 - for details for tasks to schedule, 580–581
 - example VM report, 648
 - exporting to, 453
 - for folder structure planning, 8–9, 9
 - exporting, **11–14**
 - importing, and creating object for mass deployment, 152
 - for multiple datastores, 72, 72–73
 - separators between fields in, 534
 - from vEcoShell, 637
 - for VMware PowerPack reports, 646
- current state of task, 616
- custom attributes, **157–163**
 - backup to notes, **159–161**
 - Created by/On custom attribute, 158
 - information overload and, 163
 - restoring from notes, **161–162**
 - VM last modified by, 158
- custom-changed.psl script, 524
- custom credential dialog box, 357
- custom objects, creating, **452–453**
- custom PowerCLI module, downloading, 94
- custom scripts
 - folder for, 207
 - location, 157
- CustomFieldDef type, 600
- customization specifications, **174–178**, 180
 - cloning to nonpersistent specification, 181–182
 - for configuring Linux guest postdeployment, 184
 - creating, **174–175**
 - for deploying VM, 138
 - managing, **175–176**
 - with multiple network adapters, 182–183
 - using, **176–177**

D

- data objects in vSphere API, 585
 - and methods, **600–603**
- data source name (DSN), 5
- database objects, exporting, 344
- Database property, of backup, 328
- datacenter folders, importing, **354–355**
- datacenters
 - compliance, **419–422**
 - configuring, **26–31**
 - creating, **27**, 354–355
 - exporting, **347–349**
 - importing, **353–354**
- Datacenters root folder, 345
- DataGrid, in workflow for results display, 679, 680
- DataGridView, refreshing, 713
- Datastore object, methods list for, 601
- datastore provider, viewing all, 360
- Datastore state alarm, 512
- DatastoreImpl type, 597
- datastores
 - adding, **70–77**
 - adding on free space partitions, **73–77**
 - deleting virtual disks from, 217
 - determining congestion threshold for, 112
 - moving all VMs from, 254–256
 - multiple, **72–73**
 - searching for file matching pattern, 139–141
 - verifying renaming, 603
- DCUI (Direct Console User Interface)
 - access rights for HCN01
 - configuring, 392
 - reporting, 392
 - limiting risk from connections, 391–392
- debugging scripts, in PowerWF Studio editor, 667
- default Credential Request dialog box, 356
- default gateway, changing for VM, 156
- default historical intervals, on vCenter Server, 468, 468
- default storage, share allocation by host, 106–107
- Delete-HardDisk function, 217–218
- delta disk, 435
- demilitarized zone (DMZ) environment, memory limit, 199
- deployment
 - of hosts, including patches, **416**
 - Linux guests from template, 184
 - virtual machines, from template, **137–139**
 - of workflows, 668, 668–669
- deprecated methods, in vSphere API, 601
- Description property, of alarm object, 503
- deserializing PowerShell objects, 526

Detach-Baseline cmdlet, 412
 development environments, workflows deployed for, 670
 device key, 146
 df command (Linux), 232, 414
 DHCP (Dynamic Host Configuration Protocol)
 changing vDS network adapters to use, 104
 for IPv4 and IPv6, enabling, 296
 digital certificates, scripts signed with, 576
 Direct Console User Interface (DCUI)
 access rights for HCN01
 configuring, 392
 reporting, 392
 limiting risk from connections, 391–392
 disaster recovery. *See also* backup
 Site Recovery Manager for, **311–313**
 PowerShell functions for automating, **311–312**
 Disconnect-SRMServer function, 312
 disconnecting host, 340
 Discovered virtual machine folder, 357–358
 disk space
 displaying available, 414
 for do-it-yourself backup, 307
 reserving for snapshots, 257
 for template deployment, checking for, 138–139
 use by snapshots, 259
 DiskMode property, of VirtualDevice objects, 374
 DiskPart.exe script, 249
 Distributed Power Management (DPM), 27, **29–31**, 113–117
 configuring, 114–116
 enabling on cluster, 116
 function to report status, 113–114
 Distributed Resource Scheduler (DRS), 27, **28–29**, 113, 251, 445
 disabling, 645, 645
 distributed switches, **78–83**
 hardening guidelines on MAC address changes, 397–398
 migrating VMs from, 91
 Distributed Virtual Port Group (DVPG)
 creating, 96–97
 creating network adapters on, 103
 DistributedSwitch PowerCLI module, downloading, 95
 DMZ (demilitarized zone) environment, memory limit, 199
 DNS server, adding to existing specifications, 175
 documentation, for managed objects, 600–601
 domain environment
 membership, 5
 PowerShell remotig in, 242
 DOS prompt, workflow to create guest from, 671, **671–675**
 Download-Patch cmdlet, 408
 downloading
 custom PowerCLI module, 94

DistributedSwitch PowerCLI module, 95
 PowerPacks, 639
 DPM. *See* Distributed Power Management (DPM)
 DRS. *See* Distributed Resource Scheduler (DRS)
 DRSAutomationLevel property, in vEcoShell Cluster node, 641
 -DrsEnabled parameter, for New-Cluster cmdlet, 355
 DRSEnabled property, in vEcoShell Cluster node, 641
 DVPG. *See* Distributed Virtual Port Group (DVPG)
 dynamic baselines, 406
 creating, 407
 Dynamic Host Configuration Protocol (DHCP)
 changing vDS network adapters to use, 104
 for IPv4 and IPv6, enabling, 296
 Dynamic Host Configuration Protocol (DHCP) enabled
 VLAN, changing VM network to, 137

E

eager zeroed thick, 146
 email
 notification to creator of old snapshot, 261–264
 sending reports, **462**
 email action, **520**
 for alarm object, 504
 empty default modal form, 691
 empty default modeless form, 691
 empty string, as source object for Select-Object cmdlet, 452
 Enable-PSRemoting cmdlet, 241
 Enabled property, of alarm object, 503
 encrypted session
 configuring for HCM04, 391
 Hardening guide on, 384–385
 encrypting password, for vKickstartomatic, 40
 #endregion directive, 705
 Enhanced VMotion Compatibility (EVC), 27, **29**
 Enter-PSSession cmdlet, for interactive session, 243
 EnterMaintenanceMode_Task, vSphere API Reference
 information on, 588, **588–589**
 Enterprise Plus licensing, 79
 enterprise provisioning systems, 131
 entities, Onyx hard-coded references to, **633**
 -Entity parameter, for Get-Stat cmdlet, 483
 Entity property, 484
 enumerated data objects, 587
 environment variables
 for alarm script, 515–516
 example of script use, 516
 error handling after, asynchronous task, **619**
 \$Error variable, 518

errors

- continuing script after, 518
- forcing in script, 518–519
- from remediation task submission to cluster, 417
- escape character, of PowerShell, 580
- Escape-MetaCharacters filter, 359
- ESX Deployment Appliance (EDA), 416
- ESX hosts
 - and Active Directory, 120
 - evacuating VMs from, 252–253
 - finding host HWuptime, **613–614**
 - finding patches installed on, **612–613**
 - migrating VMs between, 250
 - reconnecting after restore, **340–344**
 - swap file for VM, 199
 - tracking block changes, 308
- ESX log viewer, **675–681**
- ESXi, and Active Directory, 120
- ESXi(i) servers
 - aggregated data retention by, 468
 - Get-VMHostFirmware cmdlet on, 385
 - grouping by hostname, 491–493
 - hardening guidelines, **375–394**
 - Onyx connection to, **623–626**
 - proxy.xml file changes on, 384
 - statistical data from, 464
- ESXiHostReport.ps1 script, 571
- esxupdate command, failure from incorrect parameter, 617
- Evacuate-VMHost function, 252–253
- EVC (Enhanced VMotion Compatibility), 27, 29
- event alarms, **506–511**
- event collector, script removal of, 712
- event functions, in script layout template, 696
- event handler, 694
- event logger, 704–713
- EventAlarmExpression object, 506
 - populating properties in, 510
- EventAlarmExpressionComparisonOperator enumerator, 510
- EventChainId parameter, for Get-VITaskSDK function, 551
- EventEx type, 506, 534
 - information to define, 509–510
- EventHistoryCollector, 544, 704
- EventMonitor-Load function, 707
- events, **530–535**
 - common attributes, 511
 - discovering for Windows Forms objects, 695
 - Hierarchy property of, 533
 - properties available for, 540, 540–541
 - retention configuration, **554–560**, 555
 - functions to change, 558–559
 - for Windows Form, 690
- Events view, 531
- eventTypeID property, 510, 542
- Excel, exporting output to, **454–459**
- Exchange 2007 PowerPack, 637
- Exit-PSession cmdlet, 243
- Exit-SRMRecoveryPlan function, 312
- Export-Clicked function, 707
- Export-Clixml cmdlet, 499
- Export-Console cmdlet, 574
- Export-CSV cmdlet, 420–421, 453
 - assumption about rows, 552
 - UseCulture parameter, 534
- Export-PermissionsToCSV function, 22–24
- Export-VApp cmdlet, 273
- Export-VBRBackup cmdlet, 321
- Export-VBRJob cmdlet, 321
- Export-VBRServer cmdlet, 321
- Export-Xls function, 454–459
- exporting
 - folder structure, **11–14**
 - permissions, **22–24**
 - report output, **453–462**
 - to CSV file, 453
 - to Excel, **454–459**
 - to HTML, 459, **459–462**
 - vCenter Server inventory items, **344–353**
 - clusters, **349–350**
 - datacenters, **347–349**
 - folders, **345–347**
 - hosts, **352–353**
 - permissions, **351**
 - roles, **350–351**
 - VM locations, **352**
- Expression property, of alarm object, 503
- expressions
 - for alarm object, **505–506**
 - in here-string, 265
- ExtendedEvent type, 506, 534
 - information to define, 509–510
- extending virtual disks, **218–221**
- ExtensionData property, 441, 445
 - for MoRef of cluster, 608
 - of VIOObject, 598
- .ExtensionData.Guest.GuestId property, 248
- external file, for storing statistical data, 499–500
- extraConfig property, of VirtualMachineConfigSpec object, 374
- extracting data, text output for, 233–235

F

- fault objects, 587
 - in vSphere API, 585, **615–618**
- Fault Tolerance (FT). *See* VMware Fault Tolerance (FT)

Fibre Channel SAN, 68
 creating datastore on, **71**
 logical unit number from, 70
 multiple HBA connections, 77–78
 -File parameter, for cmd.exe, 572
 files
 monitoring ownership status, 510
 searching datastore for those matching pattern, 139–141
 filter
 for collector, 544
 with Where-Object cmdlet, 135
 Find-VBRDatastore cmdlet, 321
 Find-VBRObjct cmdlet, 321
 Find-VBRResourcePool cmdlet, 321
 Find-VSBVirtualLab cmdlet, 321
 finding
 host HWuptime, **613–614**
 methods, **610–615**
 patches installed on ESX host, **612–613**
 right search term, 612
 service managers, **618**
 -Finish parameter, for Get-Stat cmdlet, 483, 487
 Finished-Clicked function, 707
 firewall, 236
 configuration on ESX server, 399–400
 fixedPolicy setting, for IP allocation policy, 293
 FloatSampleImpl objects, 483
 floppy drive, connecting, 220
 folders, 26
 for custom scripts, 157
 exporting, **345–347**
 importing, **353–354**
 for datacenter, **354–355**
 inconsistent names for VMs and templates, 655, 655
 for PowerPacks, 685
 retrieving structure, 346
 structure setup for vCenter Server, **8–15**
 creating from scratch, **8–10**
 exporting, **11–14**
 importing, **14–15**
 fonts, changing for Onyx, 628
 ForEach activity, 676, 679
 form construction, in script layout template, 696
 Format-List cmdlet, 431
 Format-Table cmdlet, 448
 -AutoSize parameter, 446
 forms. *See* Windows Forms (WinForms)
 -Fragment parameter, for HTML report, 461
 free space. *See* disk space
 FT. *See* VMware Fault Tolerance (FT)
 full database backup, **328–329**

G

Gem-VMHost cmdlet, 438–439
 General functions, in script layout template, 696
 Generate vDiagram action, 649
 parameters available, 649
 Get-Addressbook cmdlet, 318
 Get-ADUserObject function, 261–264
 Get AggregationJobs function, 466–468
 Get-AlarmEventId function, 507–510
 for alarm trigger information, 506
 Get-AlarmScript function, 526
 Get-AppStartOrder function, 274–276
 Get-BackupGroupEntity cmdlet, 318
 Get-Baseline cmdlet, 410
 Get-CatalogSearchData cmdlet, 318
 Get-CatalogStatus cmdlet, 318
 Get-ChildItem cmdlet, 360–361
 Get-Cluster cmdlet, 349–350, 412, 423, 445–450
 Get-ClusterSummary function, 446–448
 Get-Compliance cmdlet, 412, 419–422, 424
 -Detailed parameter, 423–424
 Get-Configoption cmdlet, 318
 Get-Connection cmdlet, 318
 Get-Credential cmdlet, 356, 414
 Get-Datacenter cmdlet, 347
 Get-Datastore cmdlet, 318, 346, 597
 Get-DistributedSwitchCandidate function (DistributedSwitch module), 97
 Get-DPM function, 113
 Get-EventRetention function, 558
 Get-Folder cmdlet, -NoRecursion parameter, 345
 Get-FolderPath filter, 11–14
 Get-FolderStructure function, 346
 Get-Help cmdlet, for TaskScheduler module function, 578
 Get-HostDetailedNetworkInfo function, 79–82
 Get-InventoryEntity cmdlet, 318
 Get-IpPool function, 282–283
 Get-IsCsiHbaTarget function, 377–381
 Get-Job cmdlet, 318
 Get-JobTemplate cmdlet, 319
 Get-LicenseKey function, 31–33
 Get-LinuxVolumes cmdlet, 319
 Get-Member cmdlet, 484, 597–598, 608–609, 695
 Get-MissingPortGroups function, 448–450
 Get-Module cmdlet, 659
 Get-Network cmdlet, 287–288, 319
 Get-<noun> cmdlets, 430
 Get-OfDetails function, 270–271
 Get-OSCustomizationNicMapping cmdlet, 182
 Get-OSCustomizationSpec cmdlet, 176

- Get-Patch cmdlet, 406
- Get-PatchBaseline cmdlet, 410
- Get-PSDrive cmdlet, 360
- Get-PSProvider cmdlet, 360
- Get-PSSnapin cmdlet, 659
- Get-Repository cmdlet, 319
- Get-RepositoryJob cmdlet, 319
- Get-RepositorySavePoint cmdlet, 319
- Get-SavepointDisk cmdlet, 319
- Get-SavePointFileSize cmdlet, 319
- Get-SavePointManifest cmdlet, 319
- Get-SCSIFreePartition function, 73–75
- Get-ScsiLun cmdlet, 70, 78
- Get-Service cmdlet, 241
- Get-SIOC function, 107–109
- Get-Snapshot cmdlet, 435
- Get-SnapshotExtra function, 259–261
- Get-SnapshotTree function, 259
- Get-SRMPlanFinalResponse function, 312
- Get-SRMPlanStatus function, 312
- Get-SRMRecoveryPlan function, 312
- Get-Stat cmdlet, 483
 - Finish parameter, 487
 - parameters, 483
 - Start parameter, 487
 - statistical data returned by, **483–485**
- Get-Stat Yesterday's Average CPU Values script, 660–661
- Get-StatInterval cmdlet, 469, 483
- Get-StatReference function, 485–486
- Get-StatType cmdlet, 474–475, 483
- Get-StatTypeDetail function, 476–479
- Get-TaskRetention function, 558
- Get-vAppIPAssignment function, 293–294
- Get-vAppProductInfo function, 296–297
- Get-VBRBackup cmdlet, 322
- Get-VBRBackupSession cmdlet, 322
- Get-VBRFilesInRestorePoint cmdlet, 322
- Get-VBRInstantRecovery cmdlet, 322
- Get-VBRJob cmdlet, 322
- Get-VBRJobObject cmdlet, 322
- Get-VBRJobObjectVssOptions cmdlet, 322
- Get-VBRJobOptions cmdlet, 322
- Get-VBRJobScheduleOptions cmdlet, 322
- Get-VBRJobVSSOptions cmdlet, 322
- Get-VBRLocalhost cmdlet, 322
- Get-VBRReplica cmdlet, 322
- Get-VBRRestorePoint cmdlet, 322
- Get-VBRRestoreSession cmdlet, 322
- Get-VBRServer cmdlet, 322
- Get-vCenterScheduledTask function, 568
- Get-VIEvent cmdlet, **535–543**, 560
 - examples, **537–543**
 - changed permissions, **539–541**
 - guests cloned in last month, **538**
 - guests created in last month, **537–538**
 - person making changes, **538–539**
 - report on successful job completion, **541–542**
 - role manipulation, **539**
 - Update Manager actions, **542–543**
- Get-VIEventSDK function, 544, 547–550, 554
- Get-VIEventType function, 531–535
- Get-View cmdlet, 341, 359, 451, 596, 597, 608
 - and licensing information, 31
 - to retrieve managed object copy from MoRef, 605
 - shortcuts for finding service managers, **618**
- Get-VILocation filter, 354–355, 357
- Get-VIPath function, 348–349, 352
- Get-VIPermission cmdlet, 351
- Get-VIPrivilege cmdlet, 16–17, 358
 - PrivilegeGroup parameter, 18
- Get-VIRole cmdlet, 19–20, 350–351
- Get-VirtualPortGroup cmdlet, 82
- Get-VirtualSwitch cmdlet, 82
- Get-VITaskSDK function, 544, 545–547, 554
 - flow, 550
- Get-VM cmdlet, **430–436**
- Get-VmDisk cmdlet, 319
- Get-VMDiskMapping function, 212–216
 - output, 216–217
- Get-VMMDKVolume cmdlet, 319
- Get-VMGuest cmdlet, 436
- Get-VMGuestDiskUsage function, 437–438
- Get-VMGuestId function, 133–135, 248
- Get-VMGuestNetworkInterface cmdlet, 248, 437
- Get-VMGuestRoute cmdlet, 155–156, 248
- Get-VMHost cmdlet, 412
 - metacharacters in, 491
- Get-VMHostAuthentication function, 120–122
- Get-VMHostFirewallDefaultPolicy cmdlet, 399–400
- Get-VMHostFirewallException cmdlet, 383, 400
- Get-VMHostFirmware cmdlet, on ESXi server, 385
- Get-VMHostHba cmdlet, 69
- Get-VMHostNetworkAdapter cmdlet, 79, 440–441
- Get-VMHostPciDevice function, 442–445
- Get-VMHostPnic function, 98–100
- Get-VMHostSnmp cmdlet, 62
- Get-VMHostStorage cmdlet, 70, 383
- Get-VMResourceConfiguration cmdlet, 199, 204, 434
- Get-VpxOption function, 555–557
- Get-VSBApplicationGroup cmdlet, 322
- Get-VSBJob cmdlet, 322
- Get-VSBJobOptions cmdlet, 322

Get-VSBJobScheduleOptions cmdlet, 322
 Get-VSBSession cmdlet, 322
 Get-VSBTaskSession cmdlet, 322
 Get-VSBVirtualLab cmdlet, 322
 Get-WmiObject cmdlet, 236, 243
 GetAlarm method, 606–608
 GetEnumerator() method, 355
 GetGVShortcuts function, 618
 GetLog activity, 676, 678
 getLogType activity, 676, 676
 GetType method, results returned by, 597
 GetVIEventType function, 539
 getVMHost activity, 675
 \$global:defaultvsi servers variable, 654
 GnuWin32 project, 385
 Go-Clicked function, 707
 graphical flow, in PowerWF Studio, 666, **666–667**
 graphical user interface (GUI). *See also* PowerGUI; vEcoShell (Vizioncore)
 script layout template, **695–696**, 696
 components, 696
 tools for creating, **688–690**
 value of, **688**
 graphics, assembly for features, 698
 Group Alarm action, for alarm object, 505
 Group-Object cmdlet
 expressions, 493–495
 Values property, 491
 GroupBox control, 701, 703
 grouping actions, for alarms, 503
 grouping statistical data, **490–497**
 in nested groups, 495–497
 groups, viewing available, 18
 guaranteed zero downtime, 105
 guest custom attribute change alarm, 523–524
 guest IDs, 132
 querying vCenter Server for, 133–136
 guest network connectivity alarm, 522–523
 guest operating system
 interaction, **230–250**
 with Linux native tools, **231–235**
 with PowerCLI methods, **245–250**
 with Windows native tools, **235–245**
 native methods, 230
 patching, 194
 reports on, **436–438**
 guest-specific parameters, for Remediate-Inventory cmdlet, 415
 GuestDiskExpansion_WindowsGuest.bat file, 249
 guests
 applying customization specifications to, 177
 deploying from templates, **179–185**

 in DMZ, and independent-nonpersistent disks, 373–375
 extending partition, 219
 migration, vSphere API Reference on, 592–595
 password, 176
 workflow to create from DOS prompt, 671, **671–675**
 GUI (graphical user interface). *See also* PowerGUI; vEcoShell (Vizioncore)
 for automation management, **636–637**
 script layout template, **695–696**, 696
 components, 696
 for scripts, 704
 tools for creating, **688–690**
 value of, **688**
 GuiRunOnce component, 176
 gzip command, 385
 gzipped tar (TGZ) file, 385

H

HA (VMware High Availability), 105
 HAEnabled property, in vEcoShell Cluster node, 641
 HAFailoverLevel property, in vEcoShell Cluster node, 641
 hard-coded references, to entities from Onyx, **633**
 hard disks
 adding to VM, 208–209
 defining for VM, 146–147
 moving, 254
 hardening system, 368. *See also* vSphere 4.0 Security Hardening Guide
 hardware
 defining for target VM, 144–146
 hard disks, 146–147
 network adapters, 148–150
 removing unused, 206
 upgrading, **188–193**
 forcing, 189
 hash table
 for Apply-VMHostProfile function, 53
 for folder structure, 346–347
 passing to Set-VMHostAdvancedConfiguration cmdlet, 62
 for ToolsVersion property, 433
 HBAs, CHAP authentication configuration
 checking, 376–377
 setup, 382
 -Head parameter, for HTML report, 460
 help, in PowerWF Studio editor, 667
 here-string, **265**
 Hierarchy property, of events, 533
 High Availability (HA), 105, 445
 configuring, **27–28**

historical intervals (HIs), 464, 465, **468–470**

changing parameters for, 469–470

changing statistics level, 473

History list box in Onyx, 623, 624

HistoryCollector, 544

host Fibre Channel adapters, World Wide Port Numbers (WWPN) of, 439–440

host HWuptime, finding, **613–614**

Host Overcommit report, 655, 655

host profiles, 38, **52–61**, 87

applying to noncompliant host, 119

applying to vSphere host, 55–56

associating, 118–119

attaching to vSphere host, 53

automating, 53

configuring, 117–120

creating, 118

options for settings, 52

selection, 52

working without access to, **61–65**

host provisioning life cycle, 63

Host Update Utility component, adding to install script, 8

HostPatchManager page, 612

HostPatchManagerMatchManagerOperationSpec object, 617

HostRuntimeInfo, vSphere API Reference on, 589

hosts, 44

applying host profile to noncompliant, 119

available disk space for staged patches, 413

copying network configuration from another, **86–89**

creating, **356–357**

creating folders, 355

default storage share allocation by, 106–107

exporting, **352–353**

generating compliance report for, 420

including patches in deployment, **416**

licensing, **33–34**

memory contention on, 200

number in cluster, 445

remediating, **414–415**

reports on, **438–445**

bus adapters, **439–440**

network interface cards, **440–441**

PCI devices, **441–445**

scanning, for needed patches, **412–413**

setting in maintenance mode, 588, **588–589**

testing for compatibility, 97

HostSystem managed object, 613–614

HostSystem state alarm, 512

HP Business Service Automation (HP-BSA), 131

HTML

custom report, 461–462

emailing report in, 462

exporting output to, 459, **459–462**

page for available metrics, 485–486

for tasks and events report, 551

from vEcoShell, 637

for VMware PowerPack reports, 646

HTTP, specifying for Connect-VIServer cmdlet, 625

I/O control, for storage, 106–112

ICO format, for icons, 658

Icomasoft, PowerScripter, 671

If statement, for testing snap-in availability, 573

Import-Clixml cmdlet, 353, 499

Import-CSV cmdlet, 72, 409–410, 581

Import-Folders function, 14

Import-Module cmdlet, 577

Import-Permissions function, 24–26

Import-vApp cmdlet, 273–274

Import-VBRBackup cmdlet, 322

Import-VBRJob cmdlet, 322

Import-VBRServer cmdlet, 322

Import-VMLocation function, 14–15

importing

CSV files, and creating object for mass deployment, 152

folder structure, **14–15**

permissions, **24–26**

PowerPacks, 637

scripts into PowerWF Studio editor, 668, 668

vApps, from OVF, 273

vCenter Server inventory items, **353–359**

clusters, **355–356**

datacenter folders, **354–355**

folders and datacenters, **353–354**

hosts, **356–357**

permissions, **358–359**

roles, **358**

VM and host folders, **355**

VM locations, **357–358**

virtual appliances, **270–272**

VMware Community PowerPack, **653–658**, 654

Incremental property, for differential backup, 330

independent-nonpersistent disks

checking for, 374

guests in DMZ and, 373–375

Index, in vSphere API Reference, 586, 587

Info property, of TaskEvent object, 535

information overload, custom attributes and, 163

infrastructure, optimizing, 62

inheritance, 21

of method in vSphere API, 601

initialization, in script layout template, 696

inMaintenanceMode property, vSphere API Reference on, 588, 588

input/output operations per second (IOPs), 107

input parameters, creating, 682, 683

installing

- vCenter Server, 337
- vCenter Update Manager PowerCLI snap-in, **404–405**
- VMware Tools
 - bash script for, 165–166
 - en masse, 171
- vSphere Hypervisor
 - automating, **37–65**
 - KickStart for customizing, **38–43**
 - postinstallation configuration, **43–65**
 - preparation, **36–37**
 - software for, 37

Instance property, for grouping statistical data, **490–491**

instances, **479–482**

interactive session, Enter-PSession cmdlet for, 243

Internet Information Server (IIS), specification to install, 176

intervals for statistics collection, 465

- manipulating, **497–498**
- setting intervals, **488–489**

Invoke-Command cmdlet, for tempoary session, 242–243

Invoke-SRMRecoveryPlan function, 312

Invoke-SSH function, 167–170, 231, 232, 413–414

Invoke-VIEventMonitor function, 706–707, 712–713

Invoke-VMScript cmdlet, 154–155, 157, 171, 219, 231, 245–250, 436

- retrieving partition information with, 246

IOPs (input/output operations per second), 107

IP, changing en masse for VMs, 156

IP addresses

- changing for VM, 207
- configuring vApp to provision, **293–296**
- static, assigning to Windows Server, 180–181
- for vCenter Server, 4

IP-based storage, creating VMkernel port group for, 84

IP pools, **282–293**

- creating, 284–287
- for IPv4 and IPv6, enabling, 296

iSCSI storage area networks (SANs), 68

- configuring, **69**
- creating datastore on, 71
- logical unit number from, 70

iSCSI traffic, CHAP authentication for, 375

ISO Image editing tool, 37

ISO image file, connecting CD drive to, 220

iTripoli, Admin Script Editor, 690

J

JavaScript, Onyx project output for, **631**

K

key names, 433

key-value pairs, 433

L

Lam, William, 266

latency, 107

licensing, **31–34**

- backup of files, 334
- host, **33–34**
- listing keys registered on vCenter Server, 31–33

links, in vEcoShell, 641, 642, **642–646**, 644

Linux

- Bash scripts on, 245–246
- customization specifications for, 175
- deploying guests from template, 184
- retrieving partition information with Invoke-VMScript cmdlet, 246
- silent install, **165–170**
- SSH, for operating system interaction, 231
- updating VMware Tools for guest, 171

Linux KickStart, 38, 132

- for customizing installation, **38–43**

list boxes, adding to form, **697–698**, 698

ListBox object, 698

literal text, here-string to hold multiline, 265

Load assemblies component, in script layout template, 696

local administrator account, password for, updating, 176

local storage, 68

- creating new datastore on, **70–71**

local user accounts, retrieving informaiton with WMI, 237–238

localadmin group, 392

LocalizedMessage property, 617

location, 9–10

Location property, of button, 693

Lockdown mode

- checking status, 393–394
- on ESXi server, 392–393
- on vSphere host, enabling, 46

logging

- appending errors to log file with alarm script, 517–518
- backup of log files, **330**

logging (*continued*)

- creating viewer, **675–681**
- enabling FT logging across clusters, 104
- in Onyx project, 629, 629
- options for vCenter Server, changing, **614–615**
- separate output tab for each, 678
- VMware Fault Tolerance (FT), enabling across cluster, 104
- logical unit number (LUN), 70
- LogViewer script, 680–681
- LogViewer window, 680
- loop
 - to wait for asynchronous task completion, **618**
 - in workflow, 676

M

- MAC (Media Access Control) address
 - guidelines on changes for virtual switches, 396–397
 - license based on, 206
- MAC Address Change policy, setting to reject, 398–399
- Maintenance mode
 - dropping host in and out of, 54
 - placing host in, 413
 - setting host in, 588, **588–589**
- managed ESX(i) servers, aggregated data retention by, 468
- managed hosts, connection details, 640
- Managed Hosts node (VMware PowerPack), 639
- managed object reference. *See* MoRef (managed object reference)
- managed objects in vSphere API, 585, 587, **596–605**
 - documentation, 600–601
 - service managers, **603–605**
 - types, **597–600**
- ManagedEntity object, Rename_Task method, 601, 601–602
- management packs, 685
- Mandatory Variable option, for workflow, 673
- mass deployment, **150–157**
 - postconfiguration and validating virtual machines, **154–157**
 - preparing for, **151–152**
 - running synchronous or asynchronous, **152–154**
- master configuration script, 56–61
- Measure-Object cmdlet, 17
- Media Access Control (MAC) address
 - guidelines on changes for virtual switches, 396–397
 - license based on, 206
- MemLimitMB parameter, 199
- memory, changing virtual, **198**
- memory limit, ranges, 200
- memory reservation, ranges, 200
- memory state, in snapshot, 257
- MemReservationMB parameter, 199
- MemSharesLevel parameter, 200
- metacharacters, in Get-VMHost cmdlet, 491
- metadata, for appliance, 270
- Method Action action, for alarm object, 504
- method actions, 503
- methods
 - finding, **610–615**
 - of service manager, 606
 - of VIObjct, 597–598
- metric alarms, **512**
- metrics, **473–479**
 - instances, listing available, 482
 - listing available, 476–479
 - retrieving, 475
 - selection for reports, **485–486**
- Microsoft Code Gallery website, 576
- Microsoft MSDN Library, 236
- Microsoft .NET class, defining, 453
- Microsoft SQL database, scheduling backup, 327
- Microsoft SQL Express 2005, PowerShell for scheduling backup, 327
- Microsoft SQL Server, designing virtual, 208
- Microsoft, Sysinternals website, 514
- Microsoft System Center Configuration Manager (SCCM), 131
- Microsoft TechNet, 668
- Microsoft.SqlServer.SmoExtended assembly, loading in scripts, 328
- modal form, empty default, 691
- modeless form, empty default, 691
- modules, 577
 - workflows deployed as, 669, 670, **683–686**, 684
- monitoring. *See also* alarms
 - determining elements for, **502–503**
- MoRef (managed object reference)
 - of cluster, ExtensionData property of, 608
 - hard-coded in Onyx, **633**
 - for service managers, 603, **605–609**
- MoRef property, for managed objects, 605
- Move-ToNewPortGroup function, 89–90, 91
- Move-ToolsToVA cmdlet, 319
- Move-VM cmdlet, 251, 253, 358, 592
- moving
 - alarms, **526–528**
 - hard disks, 254
 - virtual machines, with vMotion, **251–256**
 - VM configuration file, 254
- multipath policy, for storage, 77–78
- myAlarm.ps1 file, 526–528

N

NAA (Network Address Authority) identifier, 71
 Name parameter, for New-VM cmdlet, 131
 Name property
 of alarm object, 503
 of data objects, 600
 in vEcoShell Cluster node, 641
 names
 of Windows Server Administrator account, changing, 238–240
 of workflows, 669
 Native Multipathing (NMP) module, 77
 nested data object, creating, 610
 nested groups, for statistical data, 495–497
 .NET class (Microsoft), defining, 453
 .NET Framework, 688
 .NET View objects, 596
 .NET VIObjects, 585
 network adapters
 adding or removing, **205–206**
 changing to use DHCP, 104
 creating on DVPg, 103
 defining for VM, 148–150
 of hosts, reports on, **440–441**
 position within customization specification Nic mapping, 182
 Network Address Authority (NAA) identifier, 71
 Network File System (NFS) storage, 68
 creating datastore on, **72–73**
 networking standard switches, with vEcoShell, 650
 networks
 assigning, **207–208**
 configuring IP pool for, 289
 copying configuration from another host, **86–89**
 getting those needing IP pool configuration, 288
 setup, **78–91**
 switches, **78–83**
 for VM, changing to DHCP enabled, 137
 New-Alarm function, 512, 520–521
 New-BackupFlag cmdlet, 319
 New-BackupGroupMember cmdlet, 319
 New-CDDrive cmdlet, 220
 New-Cluster cmdlet, 355–356
 New-DailySchedule cmdlet, 319
 New-Datacenter cmdlet, 354
 New-Datastore cmdlet, 70, 71
 New-DistributedSwitchPortGroup command, 96–97
 New-eCollector function, 706
 New-EmailAddress cmdlet, 319

New-FloppyDrive cmdlet, 220
 New-FolderStructure filter, 353–354
 New-HardDisk cmdlet, 208–209, 210
 -ThinProvisioned switch, 223
 New-IntervalSchedule cmdlet, 319
 New-IPPool function, 284–287
 New-IScsiHbaTarget cmdlet, 69
 New-MonthlySchedule cmdlet, 319
 New-NetworkAdapter cmdlet, 205
 New-Object cmdlet, 452, 609–610
 New-OSCustomizationSpec cmdlet, 174–175
 New-PartitionDatastore function, 75–77
 New-PatchBaseline cmdlet, 406–410
 New-PowerPack dialog box, 658, 659
 New-PSSession cmdlet, 245
 New-ReplicationFlag cmdlet, 319
 New-RestoreFlag cmdlet, 319
 New-SMTPServer cmdlet, 319
 New-Snapshot cmdlet, 257
 New-SpaceSavingType cmdlet, 319
 New-StatInterval cmdlet, 483
 New-Task command, 578–579
 New-VApp cmdlet, 272
 New-VIPermission cmdlet, 358
 New-VIProperty cmdlet, **451**
 New-VIRole cmdlet, 20, 358
 New-VM cmdlet, **130–143**, 179, 180, 361
 default values, 130
 progress bar for, 152
 virtual machine creation, **131–136**
 New-VMGuestRoute cmdlet, 248
 New-WebServiceProxy cmdlet, 311
 New-WeeklySchedule cmdlet, 319
 New-YearlySchedule cmdlet, 320
 NFS (Network File System) storage, 68
 creating datastore on, **72–73**
 NMP (Native Multipathing) module, 77
 nodes, in PowerPacks, 638
 -NoExit parameter, for PowerShell script, 574
 -NonInteractive parameter, for PowerShell script, 574
 nonpersistent specification, cloning customization specifications to, 181–182
 -NoProfile parameter, for PowerShell script, 574
 -NoRecursion parameter, of Get-Folder cmdlet, 345
 Notepad, for editing profile file, 405
 notes
 custom attributes backup to, **159–161**
 restoring custom attributes from, **161–162**
 -NoTypeInfoInformation parameter, for Export-Csv cmdlet, 453
 NTP, configuring, 61
 -NumMemShares parameter, 201

O

objects, 15

- adding properties and methods to existing, **450–451**
- converting text to, using substrings, 233
- creating custom, **452–453**
- saving in variables, 83

office level agreement (OLA), VMware Tools as piece, 163

offloading statistical data, **499–500**

online installation, for configuring vSphere, 44

Onyx project, 145, 150, **622–634**, 624

- configuration, **626–629**
 - Appearance, 628, 628
 - Connection, 628, 628
 - General settings, 627, 627
 - logging, 629, 629
 - obfuscation, 629, 629
 - Output, 627, 627–628
- connecting to vCenter or ESX(i) server, **623–626**
- output, 622, **630–632**, 634
 - for C#.NET 2.0, **631**
 - for PowerCLI.NET, **630**
 - Raw SOAP Messages mode, **631–632**
 - for vCO JavaScript, **631**
- references, **632–633**
- translating captured SOAP traffic, **626**, 626
- uses, **622–623**
- using in real world, **633–634**

Open Virtualization Format (OVF) files, 270

Open Virtualization Format (OVF) template, 270

OpenSSL, 40

operating systems. *See also* guest operating system

- guest ID of, 248
- maintaining updates, 404
- querying vCenter Server for, 133–136

operations manager, workflows for monitoring, 670

optimizing storage usage with thin provisioning, **223–227**

OptionManager object, SupportedOption property, 614

OptionValue parameter, of UpdateOptions method, 614

Oracle Recovery Manager (RMAN), for database backup, 327

OrAlarmExpression, 505–506

OSCustomization task, for VM clone, 137

Out-Default cmdlet, 421

Out-File cmdlet

- piping output to, 515
- for tracking script action, 517

Out-GridView cmdlet, 135, 216–217, 217, **453**, 454

Out-Host cmdlet, 669

output

- calculated properties in CSV file, 422

exporting, **453–462**

- to CSV file, 453

- to Excel, **454–459**

- to HTML, 459, **459–462**

output type selection, in PowerWF Studio editor, 667

output window, in PowerWF Studio editor, 667

OVF (Open Virtualization Format) template, 270

owner, coordinating VMware Tools update with, 171

P

parameter set, 131

parameters, for workflow activity, 672, 672–673, 673

Part command, 42

partitions

- free space, adding datastores, **73–77**

- retrieving information with Invoke-VMScript cmdlet, 246

password

- changing root, 62

- guest, 176

- preventing inclusion in Onyx information collection, 629, 629

- for vKickstartomatic, 39

- encrypting, 40

patches, **412–419**

- finding installed on ESX host, **612–613**

- in host deployment, **416**

- implementing required, **424–426**

- retrieving set for baseline, 406

- scanning hosts for, **412–413**

- staging to host, 413–414

- tasks to update, 565

- for templates, **193–196**

PatchManager, 615

Path Selection Plugin (PSP), 77

pathnames, and scheduling scripts, **572**

Pause-Completed function, 708

PCI devices

- adding, 220

- on hosts, reports, **441–445**

performance counters, 473–474

- vSphere API Reference on, 590, 591

performance, resource limits and, 204

PerformanceManager object, 590

Peripheral Component Interconnect (PCI), information for network card, 441

Perl file, 246

permission object, adding object type to, 351

permission set, 21

PermissionAdded Event event, properties, 540

- permissions
 - considerations when adding, 21
 - determining which were changed, 539–541
 - exporting, 22–24, 351
 - importing, 24–26
 - restoring, 358–359
- persistent sessions
 - creating, 245
 - for PowerShell remoting, 242
- pipeline
 - assigning output to PowerShell variable, 676, 677
 - to pass objects to New-FolderStructure filter, 354
 - in PowerShell, 154
 - to Scan-Inventory cmdlet, 412
- pipelineSequence, 675, 676
 - SuppressOutput property for, 678, 678
- PlatformConfigFault type, 617
- Plink.exe (PuTTY Link), 231
 - PowerShell function wrapping, 167
- Plug-In Manager, 686
- PNG file, converting to ICO file, 658
- pNIC mappings, modifying, 102
- port groups
 - changing VLAN ID, 650–652, 652, 653
 - creating for vSwitch, 83
 - inconsistent names, 448–450
 - isolation, 394–399
 - moving multiple VMs to new, 89–91
 - renaming, 90–91
 - resilience, 84–86
- port numbers, changing for Onyx, 628, 628
- PortWorldWideName property, 439–440
- PoshCode.org, portal into, 668
- postbuild configuration, 154
- power action levels, 117
- power efficiency, DPM for maximizing, 113
- Power Management, Distributed, 113–117
- PowerCLI, 4, 38
 - adding properties to object type, 451
 - for credential management, 176
 - Invoke-VMScript cmdlet, 231
 - Onyx project output for, 630
 - Onyx to open prompt, 623, 625
 - for operating system interaction, 245–250
 - for patches, 194
 - and scheduling scripts, 570, 571–576
 - argument issues, 574–575
 - cmdlet availability issues, 573
 - pathname issues, 572
 - PSConsole parameter issues, 573–574
 - server issues, 576
 - use in PowerWF Studio, 665–668
- PowerCLI binding, vSphere object types in, 609
- PowerCLI cmdlets, 130
- PowerCLI methods, reports with, 535–543
 - Get-VIEvent cmdlet, 535–543
- PowerCLI objects, 596
- PowerCLI session, copy of vSphere objects for, 585
- PowerCLI toolbox, 665, 665
- PowerGUI, 636
 - PowerPacks, 637–662, 671
 - nodes, 638
 - vs. vEcoShell, 639
 - workflows available in, 685
- PowerGUI.org website, 653
- PowerOff VM scheduled task, creating, 565–566
- PowerPacks, 637–662
 - changing default icon, 658
 - creating, 658–662, 662
 - creating functionality within, 660
 - downloading, 639
 - enforcing requirements, 660
 - folder for, 685
 - importing, 637
 - management, 653
 - PowerGUI, 671
 - nodes, 638
 - in vEcoShell, nodes, 638
 - VMware Community PowerPack, importing, 653–658, 654
- PowerScripter (Icomasoft), 671
- PowerShell, 4
 - cmdlets. *See also* cmdlets
 - console file, 573
 - escape character of, 580
 - modules, 577
 - workflows deployed as, 669, 670, 683–686, 684
 - objects, serializing and deserializing, 526
 - parameters for script from command line, 574
 - pipeline, 154
 - for remote management of Windows machine, 164
 - support for corporate backup applications, 315–323
 - Quest, 316–320
 - Veeam, 320–323
- PowerShell Execution Policy, 576
- PowerShell Pack, 576
- PowerShell profile, adding Update Manager PCL cmdlets to, 405
- PowerShell remoting, 235, 240–245
 - in domain environment, 242
 - enabling, 241
 - for operating system interaction, 231
- PowerShell snap-ins, 577
- PowerShell VIOjects, 596. *See also* VIOjects
- PowerWF Studio, 664
 - capabilities, 664

PowerWF Studio (*continued*)

- discovery of cmdlets, 664
- importing existing PowerShell scripts, 682
- PowerCLI toolbox creation, 665, 665
- PowerCLI use in, **665–668**
 - for scripting, 666, **666–667**
- script editor, 667, **667–668**
 - debugging scripts in, 667
- toolbox in, 685, 685

Pre-boot eXecution Environment (PXE), 36

predefined roles, 19–20

predefined values, for enumerated data type, 587

predefined variables, passing, 514–515

PrimalForms (SAPIEN Technologies), 688, 689

PrimalForms 2009 (SAPIEN Technologies), 688, 689

privileges, 15

- granting, **15–19**
- roles and, 350

Process Explorer, 514

processes on Windows Server, method for monitoring, 514

progress bar, for New-VM cmdlet, 152

PromptForCredential() method, 356–357

properties

- adding to existing objects, **450–451**
- available for event, 540, 540–541
- of service manager, 606
- of VIOObject, 597–598
- in virtual machine report, 431–432

-Protocol parameter, for Connect-VIServer cmdlet, 624

proxy, Onyx as, 622

proxy.xml file

- changes on ESX(i) host, 384
- report on settings in, 390–391
- retrieving and saving, 385–390

.PS1 files, 405

- importing scripts into editor from, 668, 668

.pscl file, 573

-PSConsole parameter issues, **573–574**

pscp.exe utility, 384

pslxml file, 421

PSP (Path Selection Plugin), 77

Puppet, 194

PuTTY, 231

PXE (Pre-boot eXecution Environment), 36

Python script, in vKickstartomatic, 65, 65

Q

quality assurance, verification script for performing, 155

query, of vApp for current settings, 276–277

QueryHostPatch_Task method, 612–613

Quest Software ActiveRoles Management Shell for Active Directory PowerShell snap-in, 637

Quest Software, PowerGUI, 636

Quest vRanger, **316–320**

- actions, 317
- capabilities, 317
- cmdlets available in PowerShell, 318–320

Quick Index, 612

-Quiesce parameter, of New-Snapshot cmdlet, 258

R

radio buttons, adding to form, **701–703**, 704

raw device mapping (RDM), 210

Raw SOAP Messages mode, Onyx project output for, **631–632**

RBAC (role-based access control) system, 15

RDM (raw device mapping), 210

real-time data, from vCenter Server, 464

real-time interval, 468

-Realtime parameter, for Get-Stat cmdlet, 483

ReconfigureDvs method, 398

ReconfigVM method, 369

ReconnectHost_Task() method, 341

reconnecting ESX hosts, after restore, **340–344**

recovery, of virtual machines, **360–365**

recurring time frames, for statistics collection, scripts for, **489–490**

references, in Onyx project, **632–633**

#region directive, 705

regions in scripts, collapsing, 705

Register-VMX function, 361–365

- as Windows application, **682–683**

registered views, for output, 421

registering

- virtual machines, **139–143**, 360
- VMX files, 361

regular event, 510

regular expressions (regex), 233–235

- reference sheet, 234

Remediate-Inventory cmdlet, 414–415

Remediate-NCN03 function, 398–399

Remediate process, 413

remediation, report on Guideline VMX01 with, 371–373

Remove-Alarm function, 524–525

Remove-AllMount cmdlet, 320

Remove-BackupGroupEntity cmdlet, 320

Remove-BackupGroupMember cmdlet, 320

Remove-Catalog cmdlet, 320

Remove-DistributedSwitchNetworkAdapter function, 105

- Remove-DistributedSwitchVMHost function, 102
- Remove-HardDisk cmdlet, 211
- Remove-JobTemplate cmdlet, 320
- Remove-LinuxVolume cmdlet, 320
- Remove-NetworkAdapter cmdlet, 206
- Remove-PSSession cmdlet, 245
- Remove-Repository cmdlet, 320
- Remove-SavePoint cmdlet, 320
- Remove-Snapshot cmdlet, 258
- Remove-StatInterval cmdlet, 483
- Remove-VBRBackup cmdlet, 322
- Remove-VBRBackupSession cmdlet, 323
- Remove-VBRJob cmdlet, 323
- Remove-VBRJobObject cmdlet, 323
- Remove-VBRReplica cmdlet, 323
- Remove-VBRRestoreSession cmdlet, 323
- Remove-VBRServer cmdlet, 323
- Remove-VirtualPortGroup cmdlet, 82
- Remove-VMGuestRoute cmdlet, 248
- Remove-VSBApplicationGroup cmdlet, 323
- Remove-VSBJob cmdlet, 323
- Remove-VSBSession cmdlet, 323
- Remove-VSBVirtualLab cmdlet, 323
- removing
 - network adapters, **205–206**
 - unused hardware, 206
 - virtual disk, **211–218**
 - VMHost from vDS, 102
- Rename-LocalUser function, 239–240
- RenameDatastore method, 600
- RenameDataTable activity, 678–679, 679
- Rename_Task method, 601, 601–602
- Renouf, Alan, 261, 430, 653
- reports. *See also* Get-VIEvent cmdlet
 - on active snapshots, 656, 656
 - on clusters, **445–450**
 - customizing, **450–462**
 - properties added to existing objects, **450–451**
 - determining information, **430–450**
 - on disabling vSphere Web Access, 383–384
 - exporting output, **453–462**
 - to CSV file, 453
 - to Excel, **454–459**
 - to HTML, 459, **459–462**
 - on guest operating systems, **436–438**
 - on Guideline VMX01, with remediation, 371–373
 - on hosts, **438–445**
 - bus adapters, **439–440**
 - network interface cards, **440–441**
 - PCI devices, **441–445**
 - with PowerCLI methods, **535–543**
 - Get-VIEvent cmdlet, **535–543**
 - on proxy.xml file settings, 390–391
 - script to create
 - on tasks and events, 551
 - on vMotions in cluster, **552–554**
 - with SDK API methods, **543–554**
 - on security status, **419–426**
 - selecting metrics for, **485–486**
 - sending as email, **462**
 - on vCenter Server scheduled tasks, **567–569**
 - on virtual machines, **430–436**
 - powered-off, 432
 - resource limits, **434–435**
 - snapshots, **435–436**
 - VMware PowerPack for, **646–649**
- #requires directive, 711
- reservations
 - report on VMs with, 434–435
 - for vCPU, 204
- reserved memory, 199
- resilience, of switches and port groups, **84–86**
- resource pool
 - defining for VM, 150
 - vApps as, 272
- response SOAP packet, enabling logging to view, 632
- Restart-Service cmdlet, 337
- Restore-MsSqlDatabase function, 338–340
- restoring
 - custom attributes from notes, **161–162**
 - vCenter Server, **336–346**
 - vCenterdatabase, **337–340**
- Results pane, in vEcoShell, 641
- Resume-SRMRecoveryPlan function, 312
- retention of tasks and events, configuring, **554–560**, 555
- retention period, for statistical data, length of, 470
- RetrieveArgumentDescription method, 511
- RetrieveHardwareUpTime method, 613–614
- return values, in vSphere API, **615–618**
- reverting to snapshot, 258
- role-based access control (RBAC) system, 15
- roles, 15
 - creating, **19–21**, **358**
 - exporting, **350–351**
 - identifying who is manipulating, **539**
- root folder, 345
- root password, changing, 62
- Run-JobsNow cmdlet, 320
- Run method, to display and interact with form, 691
- Run Script action, for alarm object, 504

running form, in script layout template, 696
RunOnce command, 176

S

SAPIEN Technologies, PrimalForms, 688, 689

SATP (Storage Array Type Plugin), 77

saving

- objects in variables, 83
- proxy.xml file, 385

Scan-Inventory cmdlet, 412, 415

scanning hosts, for needed patches, **412–413**

SCCM (System Center Configuration Manager), 131

- for patches, 194

scheduled jobs, report on successful job completion, 541

Scheduled Tasks module, **576–581**

- creating scheduled task with, 579–580

scheduling. *See also* vCenter Server Scheduler; Windows

Scheduler

- reports on, **567–569**

schtasks.exe, 570

script actions, **513–520**

- testing, 515

script editor, in PowerWF Studio, 667, **667–668**

script node, 660, 661

Script scope variables, in script layout template, 696

ScriptForm Designer, 690, 690

ScriptProperty property, 452

scripts

- collapsing regions, 705
- continuing after errors, 518
- debugging in PowerWF Studio editor, 667
- fitting collectors into, **544–550**
- folder for custom, 207
- for full database backup creation, 329
- importing existing to PowerWF Studio, 682
- layout template, **695–696**, 696
- components, 696
- loading SQL Server Management Objects in, 328
- postinstallation configuration from manually run, 45–46
- PowerShell remoting technology in, 243
- reports, on vMotions in cluster, **552–554**
- running inside VM, 245–250
- scheduling. *See also* vCenter Server Scheduler
 - PowerCLI issues, **571–576**
 - for statistics collection on recurring time frames, **489–490**
 - for tasks and events report, 551

Scripts folder, custom scripts, 207

SCSI controller, paravirtual, 147–148

SCSI pass-through device, 221

SDK API, **143–150**

- collectors, **544**

- reasons to use, **544**

- reports with methods, **543–554**

SDK documentation, web resources, 541

Search-Datastore function, 139–141

Search, in vSphere API Reference, 587

searching datastore, for file matching pattern, 139–141

secondary VM, for fault tolerance, location, 105

Secure Shell (SSH), 231

security

- hardening system, 368. *See also* vSphere 4.0 Security

- Hardening Guide

- status report, **419–426**

Select-Object cmdlet, 54, 422, 452

- for filtering reports, 432–433

Select-String cmdlet, 232

SelectedItems property, of ListBox object, 698

SelectionMode property, of ListBox object, 698

selectObject activity, 678, 678

Send-MailMessage cmdlet, 462

serializing PowerShell objects, 526

servers. *See also* ESX(i) servers; SQL Server; vCenter Server

- and scheduling scripts, **576**

service level agreement (SLA), VMware Tools as piece, 163

service managers, **603–605**

- access to properties and methods, 606

- best practices automation, 670–671

- finding, **618**

- retrieving through MoRef pointer, 605

ServiceInstance managed object, 603, 605

services

- PowerShell remoting for reporting status, 243–245

- restarting, 337

Set-Cataloging cmdlet, 320

Set-CBT function, 309–311

Set-CBTonVM cmdlet, 320

Set-Cluster cmdlet, 355, 646, 647

Set-DistributedSwitchNetworkAdapter function, 103–104

Set-DistributedSwitchVMHost function, 102

Set-DPM function, 114–116

Set-EventRetention function, 559

Set-HardDisk cmdlet, 248, 254, 374

- extending disk with, 218–221

- extending to support Windows 7 and Windows 2008 (R2), 249

Set-IPPool function, 289–292

Set-IScsiHbaTarget cmdlet, 381

Set-LicenseKey function, 33–34

Set-LinuxVolume cmdlet, 320

Set-ManagementAndvMotionRedundant function, 84–86

- Set-MountPath cmdlet, 320
- Set-NetworkAdapter cmdlet, 206, 207
- Set-PatchBaseline cmdlet, 410–411
- Set-PowerCLIConfiguration cmdlet, 518
- Set-Resources cmdlet, 320
- Set-SIOC function, 110–112
- Set-StatInterval cmdlet, 483
- Set-StatIntervalLevel function, 471–472
- Set-TaskRetention function, 558
- Set-ThinDisk function, 225–227
- Set-vAppIPAssignment function, 294–296
- Set-vAppProductInfo function, 297–300
- Set-vAppStartOrder function, 277–281
- Set-VBRJobObject cmdlet, 323
- Set-VBRJobObjectVssOptions cmdlet, 323
- Set-VBRJobOptions cmdlet, 323
- Set-VBRJobScheduleOptions cmdlet, 323
- Set-VBRJobVssOptions cmdlet, 323
- Set-VirtualPortGroup cmdlet, 84
- Set-VM cmdlet
 - applying customization specifications to guest, 177
 - MemoryMB paramter, 198
 - NumCpu parameter, 201
 - for reverting to snapshot, 258
- Set-VMAdvancedConfiguration function, 266–267
- Set-VMGuestNetworkInterface cmdlet, 156, 207–208, 248
- Set-VMGuestRoute function, 155
- Set-VMHost cmdlet, 340
- Set-VMHostAccount cmdlet, 62
- Set-VMHostAdvancedConfiguration cmdlet, 62
- Set-VMHostAuthentication function, 122–126
- Set-VMHostFirewallDefaultPolicy cmdlet, 399–400
- Set-VMHostFirewallException cmdlet, 400
- Set-VMHostHba cmdlet, 381
- Set-VMHostLockdown function, 46–50
- Set-VMHostSnmpp cmdlet, 62
- Set-VMHostSysLogServer cmdlet, 61
- Set-VMResourceConfiguration cmdlet, 199, 204
- Set-VpxOption function, 557–558, 633–634
- Set-VSBJobOptions cmdlet, 323
- Set-VSBJobScheduleOptions cmdlet, 323
- Setting property
 - of alarm object, 503
 - of OptionManager object, 614
- shares, 200
 - setting level for vCPU, 204
- shell command output, in Linux, 233
- Show method, 691
- ShowDialog method, 691
- silent install
 - of Linux, **165–170**
 - of Windows, **164–165**
- Simple Network Management Protocol (SNMP) actions, 503
- Simple Object Access Protocol (SOAP), 585
 - Onyx and, 622
 - Onyx for translating captured traffic, 626
 - Onyx for translating captured traffic, **626**
 - Onyx project output for Raw SOAP Messages mode, **631–632**
- SIOC. *See* storage I/O control (SIOC)
- Site Recovery Manager (SRM), **311–313**
 - PowerShell functions for automating, **311–312**
 - recovery plans customization, **312–313**
- Size property, of Windows Forms objects, 693
- SizeMB property, of snapshot files, 435
- SLA (service level agreement), VMware Tools as piece, 163
- SMTP server, email action and, 520
- snap-ins, workflows deployed as, 669, 670
- SnapReminder script, 261
- snapshots, 195, **256–267, 304**
 - complications from, 304
 - creating and removing, **257–258**
 - disk space used by, 259
 - listing those over 2 weeks old, 259–261
 - maintaining, **258–264**
 - report on active, 656, 656
 - reserving disk space for, 257
 - restricting creation of, **264–267**
 - reverting to, 258
 - uses, 256
 - of virtual machines, reports, **435–436**
- SNMP (Simple Network Management Protocol)
 - configuring, 62
 - confirming alarm firing of, **589–590**
- SNMP action, 520
 - for alarm object, 503, 505
- SNMP events, vSphere API Reference on, 590
- SOAP (Simple Object Access Protocol), 585
 - Onyx and, 622
 - Onyx for translating captured traffic, 626, **626**
 - Onyx project output for Raw SOAP Messages mode, **631–632**
- software, for Hypervisor install, 37
- software iSCSI adapter, enabling, 69
- Solaris JumpStart, 132
- solid state drives (SSDs), 199
- Sort-Object cmdlet, 554
 - Unique parameter, 475
- space in pathname, issues from, 572
- spreadsheet software, importing CSV file to, 453
- SQL agent rollover jobs, 344
- SQL Server
 - creating, 135–136
 - specification, 143

SQL Server Management Objects (SMO)

- loading in scripts, 328
- for restoring database, 337–338
- SqlBackup() method, 329
- SRM. *See* Site Recovery Manager (SRM)
- srm.wsdl file, 312
- SSDs (solid state drives), 199
- SSH (Secure Shell), 231
- SSL certificates, 333–334
 - restoring, 336–337
 - validity of, 340–341
- STA mode, 680
- Stage-Patch cmdlet, 413, 415
- staged patches, folder for, 413
- stand-alone application, workflows deployed as, 669
- stand-alone ESX(i) servers, statistical data from, 464
- stand-alone installation, postconfiguration tasks, 43–44
- standard switches, **78–83**
 - Start parameter, for Get-Stat cmdlet, 483, 487
- Start-Transcript cmdlet, 515
- Start-VBRInstantRecovery cmdlet, 323
- Start-VBRJob cmdlet, 323
- Start-VBRReplicaFailover cmdlet, 323
- Start-VBRRestoreVM cmdlet, 323
- Start-VBRRestoreVMFiles cmdlet, 323
- Start-VBRWindowsFileRestore cmdlet, 323
- Start-VM cmdlet, 181, 188
- Start-VSBJob cmdlet, 323
- startup order for vApp, setting, **274–282**
- Stat parameter, for Get-Stat cmdlet, 483
- state alarms, **512**
 - State parameter, of Set-VMHost cmdlet, 340
- static baselines, 406
 - updating to exclude patch, 410–411
- static IP address, assigning to Windows Server, 180–181
- static MAC address, for VM, 206
- statistical data
 - average for, 471
 - execution time improvement, **498–499**
 - gathering, **482–499**
 - with cmdlets, 483
 - interval manipulation, **497–498**
 - in nested groups, 495–497
 - historical intervals (HIs), **468–470**
 - instances, **479–482**
 - metrics, **473–479**
 - listing available, 476–479
 - retrieving, 475
 - offloading, **499–500**
 - techniques, **486–499**
 - grouping data, **490–497**
 - scripting for recurring time frames, **489–490**

- setting intervals, **488–489**
 - using correct time range, **487–488**
- from vCenter Server, **464–468**, 465
- statistics intervals, 464, 465
 - manipulating, **497–498**
- statistics levels, **470–473**
 - changing, 471–472, 473
- StatusBar control, 713
- step controls, in PowerWF Studio editor, 667
- Stop-Service cmdlet, -Force parameter, 337
- Stop-Transcript cmdlet, 515
- Stop-VBRInstantRecovery cmdlet, 323
- Stop-VBRJob cmdlet, 323
- Stop-VBRReplicaFailover cmdlet, 323
- Stop-VBRWindowsFileRestore cmdlet, 323
- Stop-VM cmdlet, 188
- Stop-VSBJob cmdlet, 323
- storage
 - adding datastores, **70–77**
 - multipath policy, **77–78**
 - optimizing usage with thin provisioning, **223–227**
 - rescanning for new, **70**
 - setup, **68–78**
 - types, **68–69**
- Storage Array Type Plugin (SATP), 77
- storage I/O control (SIOC), 106–112
 - enabling, 109–112
 - function to report status, 107–109
- storage vMotion, **250–256**
 - for converting virtual disk, **224**
 - Move-VM cmdlet to perform, 253
- <style> tag, for HTML report, 460, 460–461
- SubString() method, 233
- SupportedOption property, of OptionManager object, 614
- SuppressOutput property, for pipelineSequence, 678, 678
- Suspend-SRMRecoveryPlan function, 312
- swap files, for VM, 199
- switches. *See also* vNetwork distributed switches (vDS)
 - creating, 82
 - resilience, **84–86**
 - standard and distributed, **78–83**
- Symantec Ghost, 132
- synchronous mass deployment, **152–154**
- synchronous methods, in managed object bindings, 602
- Sysinternals website (Microsoft), 514
- syslog, configuring, 61
- Sysprep, 176
- System Center Configuration Manager (SCCM), 131
 - for patches, 194
- System Center Operations Manager, workflows for monitoring, 670
- system disk, restrictions on expanding partition, 219

system, settings of hardened system, regularly checking, 371
 System.Drawing assembly, 698
 System.Windows.Forms.SelectionMode enumeration, 698

T

Table of Contents, in vSphere API Reference, 586, 587
 tar command, 385
 target, adding, 62
 target CHAP authentication, setup for HST01, 382
 task actions, 503
 Task managed objects, 615
 local copy, 616
 Task Scheduler, in Windows Server, 575
 _Task suffix, for methods, 602
 TaskEvent objects, 535
 TaskHistoryCollector, 544
 tasks, **530–535**
 base definition, default values to create, 578
 for downloading patch definitions, 408
 retention configuration, **554–560**, 555
 changing period, 559–560
 functions to change, 558–559
 scheduling, **564–567**
 reports on, **567–569**
 with vCenter Server Scheduler, **564–567**
 with Windows Scheduler, **569–581**
 Tasks and Events Retention policy, changing, 633
 Tasks view, 530
 TaskScheduler module, functions included, 577–578
 templates, **178–196**
 automating patch life cycle, 194–196
 converting VM to, 179
 creating, **178–179**
 deploying guests from, **179–185**
 deploying Linux guests from, 184
 deploying VM from, **137–139**
 inconsistent names for folders, 655, 655
 maintaining, **185–196**
 mass deployment from, 151
 Open Virtualization Format (OVF), 270
 patches, **193–196**
 for script layout, **695–696**, 696
 components, 696
 temporary sessions, for PowerShell remoting, 242
 Test-SRMRecoveryPlan function, 312
 Test-VMHostProfileCompliance function, 119
 testing
 host for compatibility, 27
 script actions, 515
 text, converting to PowerShell object, 246–247

text output, for extracting data, 233–235
 TGZ (gzipped tar) file, 385
 thick virtual disk, 223
 converting to thin, 225–227
 Thijssen, Carl, 37
 thin provisioning, for optimizing usage, **223–227**
 threshold, for congestion, 112
 thumb drive, for installing vSphere Hypervisor, 36
 time frames, for recurring statistics collection, scripts for, **489–490**
 Timer control, in script, 712
 Timestamp property, 488–489
 toolbox, in PowerWF Studio, 685, 685
 ToolsVersion property, creating, 433
 Trace-Port function, 63–65
 translating captured SOAP traffic, with Onyx Project, 626, **626**
 transmit rate per pNIC, average on single server, 490–491
 triggers for alarm, 503
 advanced conditions, 521
 #TYPE, in CSV file, omitting, 453
 types.pslxml file, 431, 450

U

Ultimate Deployment Appliance (UDA), 37, 416
 UNetbootin, 37
 unmanaged ESX(i) servers, aggregated data retention by, 468
 Update-BackupJobTemplate cmdlet, 320
 Update Manager extension, 542
 Update-ReplicationJobTemplate cmdlet, 320
 Update-RestoreJobTemplate cmdlet, 320
 Update-TemplateHardware function, 190–193
 Update-Tools cmdlet, -NoReboot switch, 170–171
 Update-vCenterCluster function, 417–419
 UpdateOptions method, OptionValue parameter, 614
 UpdatePerfInterval method, 471
 updates, maintaining, 404
 UpdateViewData method, 603
 UpdateVirtualSwitch method, 398
 upgrade baselines, 410
 UpgradeVM method, 188
 upgrading
 hardware, **188–193**
 forcing, 189
 vCPUs in VMs, 650, 651
 URL of server, for Onyx connection, 623, 624
 USB controller, adding, 221
 USB drive, for installing vSphere Hypervisor, 36
 -UseCulture parameter, of Export-CSV cmdlet, 534
 user accounts, retrieving information with WMI, 237–238
 user-defined intervals, 497

user-defined property, adding, 450

users

assigning role or privilege, 21–22

creating roles, 19–21

defining, 15–26

V

ValidateMigrationTestType enumeration, 592, 594

Values property, of Group-Object cmdlet, 491

vApps

adding VMs to existing, 274

configuring to provision IP addresses, 293–296

creating, 272–274

cloning, 272–273

exporting, 273

as future for VM deployments, 300

IP pools, 282–293

modifying product information, 296–300

obtaining current settings, 294

query of current settings, 276–277

setting startup order for, 274–282

varied definitions, 270

variables

assigning pipeline output to, 676, 677

in here-string, 265

passing predefined, 514–515

in PowerWF Studio editor, 667

saving object in, 83

for scheduled tasks, 566–567

script referring to, 711–712

for storing CSV-formatted output, 247

verifying, 54

VBScript, 246

vCenter Client

Add Command Step button, 314

Site Recovery icon, 313, 313

vCenter Server

adding vMA OVF to, 271–272

aggregation jobs listing, 466–468

automated installation, creating, 5–8

backup, 326–336

of configuration, 333–336

clusters in, 26

finding changes to roles, 539

folder structure setup, 8–15

creating from scratch, 8–10

installing, 4, 337

inventory items export, 344–353

clusters, 349–350

datacenters, 347–349

folders, 345–347

hosts, 352–353

permissions, 351

roles, 350–351

VM locations, 352

inventory items import, 353–359

clusters, 355–356

datacenter folders, 354–355

folders and datacenters, 353–354

hosts, 356–357

permissions, 358–359

roles, 358

VM and host folders, 355

VM locations, 357–358

listing license keys registered on, 31–33

logging options, changing, 614–615

Onyx connection to, 623–626

passing predefined variables, 514–515

querying for operating systems and guest IDs, 133–136

registering VM to add to, 139

restoring, 336–346

requirements, 326–327

statistical data from, 464–468, 465

vEcoShell connection to, 639–641

vCenter Server database

backup of, 327–333

differential backup, 330

full backup, 328–329

log backup, 330

custom attributes storage, 157, 159

restoring, 337–340

vCenter Server object

connecting baseline with, 411

for network configuration and control, 94

vCenter Server Scheduler, 564–569

scheduled task creation, 564–567

vCenter Update Manager PowerCLI snap-in

installing, 404–405

remediation task and, 417

versions, system requirements, 404–405

vCheck report, 430, 656–657, 657

vCO JavaScript, Onyx project output for, 631

vCPU resources, changing, 203–205

vCPUs, changing number, 201–203

vDiagrams (Visio), 646, 649

sample, 649

vDS. *See also* vNetwork distributed switches (vDS)

vEcoShell (Vizioncore), 636, 637

connection to vCenter Server, 639–641

importing VMware Community PowerPack, 653–658, 654

networking standard switches with, 650

output formats, 637

- vs. PowerGUI, 639
- PowerPacks, **637–662**
 - nodes, 638
- Results pane, 641
- upgrading vCPUs in VMs, 650, 651
- Veeam
 - backup and replication software, **320–323**
 - PowerShell cmdlets supported, 321–323
 - verbose logging, in Onyx project, 630, 630
 - verification script, for performing quality assurance, 155
 - VI Toolkit for Windows Community Extensions, 503
 - View objects, 596
 - vim.pscl file, 573–574
 - VIOjects, 596
 - Extensiondata property of, 598
 - properties and methods, 599–600
 - representing Datastore, 597–598
- Virtu-AL.net PowerPack, 653
- Virtual Appliance Marketplace, 270
- virtual appliances, importing, **270–272**
- virtual disks
 - adding, **208–211**
 - converting in place, **224–227**
 - deleting from datastore, 217
 - extending, **218–221**
 - identifying for removal, 212
 - removing, **211–218**
 - shrinking prevention, 370
- Virtual Infrastructure eXtension (VIX) API, 174
- Virtual Infrastructure Server, installing, 4
- Virtual Machine Disk (VMDK) files, 270
- Virtual Machine File System (VMFS) datastore, creating, 73
- Virtual MachineProvisioningChecker object, 594, 595
- virtual machines
 - adding CPU to, **201–203**
 - adding to existing vApps, 274
 - advanced configuration, example, 266
 - backup
 - do-it-yourself, **304–307**
 - restoring from, **307–308**
 - changing boot delay, 611, **611–612**
 - cloning, **136–137**
 - to template, 179
 - compliance status of, 423
 - configuration file, moving, 254
 - converting to template, 179
 - creating baselines for, 407–408
 - creating folders, **355**
 - creating from DOS prompt, 671, **671–675**
 - creating vSwitch to serve, 83
 - datastores for storing, 70
 - default gateway change for, 156
 - defining new, 144
 - deploying, from template, **137–139**
 - generating compliance report for, 420
 - inconsistent names for folders, 655, 655
 - locations, **357–358**
 - exporting, 352
 - mass deployment of blank, 151
 - memory reservation configuration for, 199
 - migrating from distributed switches, 91
 - migration between ESX hosts, 250
 - moving multiple, to new port group, **89–91**
 - moving, with vMotion, **251–256**
 - New-VM cmdlet for, **130–143**
 - creating, **131–136**
 - re-registering, 142–143
 - recovery, **360–365**
 - registering, **139–143**
 - reports on, **430–436**
 - resource limits, **434–435**
 - snapshots, **435–436**
 - retrieving vSphere .NET object for, 566
 - rollback options, 416
 - running scripts inside, 245–250
 - setting start order for, 281–282
 - shutdown for maintenance, 198
 - for SQL Server, specifications, 143
 - tracking extended information on, 157
 - upgrading vCPUs in, 650, 651
 - validating, **154–157**
- virtual memory, changing, **198**
- virtual Microsoft SQL Server, designing, 208
- virtual network, associating with IP pool, 287, 293
- virtual switches, guidelines on MAC address changes, 396–397
- virtualCdrom, 144–146
- VirtualDevice objects, DiskMode property, 374
- VirtualDeviceConfigSpec object, 144, 150, 221
- virtualization administrator, vEcoShell focus on, 637
- VirtualMachine state alarm, 512
- VirtualMachineBootOptions data object, 611
- VirtualMachineConfigInfo object, 611
- VirtualMachineConfigSpec object, 611
 - extraConfig property, 374
- Visio diagrams, 649
 - from vEcoShell, 637
- visualizations, for workflows as Windows applications, 669
- Vizioncore, vEcoShell, 636, 637. *See also* vEcoShell (Vizioncore)
- vKickstartomatic, 38
 - %Post tab, 44
 - Datastore tab, 42
 - Network tab, 41–42, 42

- vKickstartomatic (*continued*)
 - password encryption, 40
 - Preview tab, 43, 43
 - Python script in, 65, 65
 - vSphere Kickstart specifications, 39
- VLAN ID, changing for port group, 650–652, 652, 653
- vm root folder, 347
- VmClonedEvent event, 538
- VMDirectPath I/O pass-through devices, adding, 220
- VMDK (Virtual Machine Disk) files, 270
- VMFS datastore, creating, 42
- VMGuest object, for report creation on disk usage, 437–438
- VMHost
 - adding to vDS, 100
 - getting existing vDS network adapter, 103
 - modifying existing vDS mapping to, 102
 - removing from vDS, 102
- VMHost parameter, for New-VM cmdlet, 131
- VMkernel network adapters, 102–103
- vMotion, **250–256**
 - creating VMkernel port group for, 83
 - enabling, 62
 - moving VMs with, **251–256**
 - requirements, **250–251**
 - script for report on all in cluster, **552–554**
- VmReconfiguredEvent event, 538–539
- VMware, versions, 205
- VMware Community PowerPack
 - active snapshots report, 656, 656
 - clusters slot information, 655–656, 656
 - Host Overcommit report, 655, 655
 - importing, **653–658**, 654
 - inconsistent folder names for VMs and templates, 655, 655
 - vCheck report, 656–657, 657
- VMware Fault Tolerance (FT), 105–106
 - disabling, 106
 - logging, enabling across cluster, 104
- VMware High Availability (HA), 105
- VMware Host Update utility, for updating ESX(i) hosts, 404
- VMware PowerPack
 - for administrative tasks, **650–652**, 651
 - for reports, **646–649**
- VMware Tools, 245
 - installing en masse, 171
 - maintaining, **163–171**
 - report on version, 432
 - updating, **170–171**
- VMware Update Manager (VUM), for updating templates, 193–194
- VMware vCenter Update Manager Check Notification task, 565
- VMware vCenter Update Manager Update Download task, 565
- VMWARE_ALARM_ environment variables, 515–516
- VMX files
 - Hardening guide settings on, 369
 - registering, 361
- vNetwork, Hardening guide on, **394–399**
- vNetwork distributed switches (vDS), **94–105**
 - adding VMHost, 100
 - advantage, 95
 - changing network adapter to use DHCP, 104
 - creating, 95–96
 - finding VMHost candidates, 98
 - network configuration with, 94–95
 - provisioning, 97, 100–102
 - removing network adapters, 104–105
- vNetwork Standard Switch (vSS), 94
- vpxd.cfg file, 327
 - backup, 334
 - restoring, 337
- vRanger (Quest), **316–320**
 - actions, 317
 - capabilities, 317
 - cmdlets available in PowerShell, 318–320
- vReports (HTML), 646, 647
 - example VM, 648
- vSphere
 - registering VM to add to, 139
 - remediation task submission to cluster, error generation, 417
- vSphere 4.0 Security Hardening Guide, **368–369**
 - COS, **399–400**
 - ESX(i) hosts, **375–394**
 - guidelines
 - CON01, 400
 - HCM03, 383–384
 - HCM04, 384–385, 391
 - HCN01, 392
 - HCN02, 393
 - HST01, 375, 376
 - NAR01, 394
 - NCN03, 396
 - NCNxx, 396
 - VMX01, 370
 - VMX22, 373–375
 - recommendation levels for guidelines, 368
- vCenter Server, 399
 - on virtual machines, **369–375**
- vNetwork, **394–399**
- vSphere API, 584
 - changing vCenter logging options, **614–615**
 - code parameter objects, **609–610**

- data objects, 585
 - and methods, **600–603**
- error handling after asynchronous task, **618**
- finding host HWuptime, **613–614**
- finding patches installed on ESX host, **612–613**
- finding service managers, **618**
- managed objects, **596–605**
 - service managers, **603–605**
 - types, **597–600**
- object model, 585
- objects, 341
- return values and faults, **615–618**
- waiting for asynchronous task, **618**
- vSphere API Reference, 584, **586–595**
 - on confirming alarm firing of SNMP trap, **589–590**
 - Datastore object, 601
 - events description, 506
 - on guest migration, 592–595
 - layout, 586, 586–587
 - on setting host in maintenance mode, 588, **588–589**
- vSphere Basic System Administration Guide, 514
- vSphere client
 - disk identifier, 41
 - Onyx to start, 623, 625, 626
 - viewing tasks and events, 530, 530–531, 531
- vSphere environment, return of all defined alarms, 608
- vSphere event logger, 705–713
- vSphere host
 - adding to AD domain, 120
 - applying host profile to, 55–56
 - attaching host profile to, 53
 - functions for complete configuration, 56–61
 - Lockdown mode, enabling, 46
 - parameterized configuration function, 50–52
- vSphere Hypervisor, installation and configuration
 - automation
 - KickStart for customizing, **38–43**
 - postinstallation configuration, **43–65**
 - preparation, **36–37**
 - software for, 37
- vSphere Management Assistant (vMA), adding to vCenter Server, 271–272
- vSphere .NET object, retrieving for virtual machine, 566
- vSphere .NET View object, 596. *See also* View objects
- vSphere objects
 - accessing in action script, 517
 - concepts, 587
- vSphere SDK, **584–585**
- vSphere statistics, average for, 471
- vSphere Web access, for HCM03
 - checking, 383
 - disabling, 384

- vSphere Web Services SDK, 584. *See also* vSphere SDK
- vSS (vNetwork Standard Switch), 94
- vSwitch, 78
- VUM (VMware Update Manager), 193–194

W

- Wait-Task cmdlet, 153
- Wait-VMGuest function, 185–188
- waiting for asynchronous task, **618**
- Web-Based Enterprise Management (WBEM), 236
- web browser, to access vSphere API Reference, 586, 586
- web resources
 - for converting PNG format to ICO file, 658
 - Microsoft Code Gallery website, 576
 - PowerPacks, 639
 - SDK documentation, 541
 - VMware Community PowerPack, 653
 - Windows Management Framework, 636
 - on WinForms controls, 713
- web service, vSphere API as, 585
- Web Services Description Language (WSDL), 311
- Where-Object cmdlet, 224, 383, 495
 - filtering with, 135
- Windows
 - customization specifications for, 175
 - running PowerShell or batch scripts, 245
 - scheduling scripts, **570**
 - silent install, **164–165**
- Windows 7 Resource Kit, 570
- Windows applications
 - Register-VMX as, **682–683**
 - workflows deployed as, 669
- Windows Deployment Services, 132
- Windows Forms (WinForms), 688, **690–703**
 - advanced example, **704–713**
 - code to display blank form, **691–692**
 - controls
 - adding, **692–695**, 693, 694
 - adding check boxes, **699–701**, 701
 - adding list boxes, **697–698**, 698
 - adding radio buttons, **701–703**, 704
 - web resources, 713
 - discovering events for objects, 695
 - form with event handler, 694–695
- Windows Management Framework, 241
 - PowerShell, 636
- Windows Management Instrumentation Command Line (WMIC), 246–247
- Windows Management Instrumentation (WMI), for operating system interaction, 231, **235–240**

Windows PowerShell. *See* PowerShell

Windows Remote Management (WinRM), checking for
install, 241

Windows Scheduler, **569–581**

Windows Server

assigning static IP address to, 180–181

method for monitoring processes, 514

Task Scheduler in, 575

Windows Server Update Services (WSUS), for patches, 194

WMI (Windows Management Instrumentation)

for operating system interaction, 231, **235–240**

for remote management of Windows machine, 164

WMI Query Language (WQL), 236, 237

workflows, 664

console application for, 674

creating, 666, 666, **671–686**

log viewer, **675–681**

new guests created from DOS prompt, 671, **671–675**

DataGrid for results display, 679, 680

deployment as PowerShell modules, **683–686**, 684

loop in, 676

Mandatory Variable option for, 673

optional parameters, 673, 674

using, **668–671**

World Wide Port Numbers (WWPN), of host Fibre Channel
adapters, 439–440

Write-Log function, 305–307

WSDL (Web Services Description Language), 311

X

XML format

for VMware PowerPack reports, 646

for vSphere API, 585

Y

yellow folders, 8, 347

Z

zero downtime, guaranteed, 105

zero-touch installation, 37