

Tooling and Automation

AWS SYSTEMS MANAGER · POWERSHELL & SDKS · CLOUDFORMATION & OPSWORKS · S3 STATIC WEBSITE HOSTING · STUDY & REVIEW

01 MUST KNOW

if you remember five things, remember these

- 01 Systems Manager at a glance:** one automation-focused **management service** for Amazon EC2 and on-premises instances. It helps you **collect software inventory, apply OS patches, create system images, and configure Windows and Linux** — you pick the instances (by ID or tag) and define the tasks. Its work is organized into nine features.
- 02 Access without the old plumbing: Run Command** runs predefined or custom commands against instances and **Session Manager** opens a browser-based shell — both **without bastion hosts, open inbound ports, or SSH keys**. IAM sets granular permissions and **AWS CloudTrail** records every action for audit.
- 03 Patch and maintain on a schedule: Patch Manager** deploys OS and software patches across large instance groups using a **patch baseline** (rules that auto-approve or reject patches); a **Maintenance Window** groups instances and runs the work on a recurring schedule with concurrency and error-rate limits — its tasks can be Run Command, Automation, Step Functions, or Lambda.
- 04 Documents, state, and secrets:** Systems Manager actions live in **SSM documents** authored in **JSON or YAML**. **State Manager** holds instances in a defined configuration state on a schedule; **Parameter Store** stores config and secrets (passwords, keys, database strings), IAM-controlled and **KMS**-encryptable; **Inventory** and the **Insights** dashboard report configuration, software, and patch-compliance data across the fleet.
- 05 Infrastructure as code, plus S3 hosting:** script AWS with the **CLI, PowerShell cmdlets, or language SDKs / APIs**; **CloudFormation** builds a **stack** of resources from a JSON/YAML template (preview changes, detect drift), and **OpsWorks** provides managed Chef/Puppet. **Amazon S3** can host a static website — create a bucket, enable hosting + public read, upload, and define an **index document**.

02 KEY TERMS

TERM	DEFINITION
AWS Systems Manager	Automation-focused management service for viewing and controlling AWS and on-premises infrastructure; you select the instances and define the operational tasks to run
SSM document	Defines the actions Systems Manager performs on managed instances; authored in JSON or YAML with sequential steps and parameters
Run Command	Runs predefined or custom commands against EC2 instances chosen by instance or tag — no bastion hosts or SSH keys; IAM-permissioned and CloudTrail-audited
Session Manager	Interactive, browser-based shell to an instance with no open inbound ports, bastion host, or SSH keys; sessions log to Amazon CloudWatch Logs or Amazon S3
Patch baseline	Set of rules in Patch Manager that automatically approve or reject which patches get installed on a patch group
Maintenance Window	Recurring scheduled window that runs tasks (Run Command, Automation, Step Functions, Lambda) with limits on concurrency and allowable error rates
Parameter Store	Central store for configuration data and secrets — passwords, keys, license codes, database strings — referenced by apps and scripts; IAM-controlled and optionally KMS-encrypted
Inventory	Systems Manager feature that collects configuration and installed-software data across instances without logging into each one
AWS Tools for PowerShell	Cmdlets that script AWS operations from the PowerShell command line; support the same services and Regions as the AWS SDKs

TERM	DEFINITION
Infrastructure as code (IaC)	Managing and provisioning infrastructure through code and templates rather than manual configuration; enabled by SDKs/APIs, CloudFormation, and OpsWorks
AWS CloudFormation	Creates, updates, and deletes a set of resources spanning multiple services as a single unit — a <i>stack</i> — from a JSON or YAML template
AWS OpsWorks	Configuration management service that provides managed instances of Chef and Puppet to automate how servers are configured, deployed, and managed

03 AWS SYSTEMS MANAGER CAPABILITIES

nine features — the exam gold of this module

FEATURE	WHAT IT DOES	REMEMBER
Automation	Runs common, repetitive IT tasks as a series of steps in an SSM document across a collection of resources	SSM docs in JSON; CloudWatch Events can trigger it
Run Command	Runs predefined or custom commands against instances chosen by instance or tag	No bastion host / SSH keys; IAM perms + CloudTrail audit
Session Manager	Opens a browser-based interactive shell to an instance	No inbound ports/bastion/SSH keys; logs to CloudWatch Logs or S3
Patch Manager	Automatically deploys OS and software patches across large instance groups	Uses a patch baseline + a maintenance window
Maintenance Windows	Schedules recurring administrative and maintenance tasks	Limits concurrency & error rate; runs Run Command, Automation, Step Functions, Lambda
State Manager	Keeps EC2 and hybrid instances in a defined configuration state	SSM doc (JSON/YAML) on a schedule; output can go to S3
Parameter Store	Stores config data and secrets for apps and scripts	IAM-controlled, KMS-encryptable; SSM docs can't reference SecureString directly
Inventory	Collects configuration and installed-software data across instances	No need to log into each instance individually
Insights	Dashboard of operational data per resource group	CloudTrail calls, Config changes, inventory, patch compliance

04 TWO WAYS TO DRIVE AWS

the module's scenario turns on this choice

AWS MANAGEMENT CONSOLE <i>point-and-click GUI — good for learning and one-off tasks</i> — Web interface; no scripting required — Visual and approachable for exploration — Fine for uploading a file or two at a time	CLI • POWERSHELL • SDKS <i>programmatic — the path to infrastructure as code</i> — Script and repeat operations predictably — Upload or archive many objects at once — PowerShell cmdlets script the same actions as the SDK for .NET — SDKs and APIs manage infrastructure as code
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05 ADMINISTRATION & DEVELOPMENT TOOLS

know each one's one-line job

TOOL	WHAT IT IS	REMEMBER
AWS Tools for PowerShell	Cmdlets that script AWS operations from the PowerShell command line	Same actions as the AWS SDK for .NET; same services/Regions as the SDKs
SDKs & APIs	Language-specific kits to call AWS services from application code	Java, Python, .NET, JavaScript, Node.js, Ruby, PHP, Go, C++; enable IaC

TOOL	WHAT IT IS	REMEMBER
AWS CloudFormation	Templates (JSON/YAML) that build a stack of resources across services	Preview changes, detect drift, extend with AWS Lambda
AWS OpsWorks	Configuration management using managed Chef and Puppet	Three offerings: Chef Automate, Puppet Enterprise, OpsWorks Stacks

06 HOST A STATIC WEBSITE ON AMAZON S3

no server-side processing required

01 Create an S3 bucket for the content → **02** Enable website hosting + grant **public read** → **03** Upload files (Console or CLI); define the **index document** → **04** Access it at the S3 **endpoint URL** → **05** Optional: Route 53 **alias records** map a custom domain

07 EXAM TRAPS

where the knowledge check gets you

- × “Run Command and Session Manager still need SSH keys and a bastion host.” — Backwards. Their whole point is managing instances **without** opening inbound ports, running bastion hosts, or maintaining SSH keys.
- × “Systems Manager only manages EC2 instances inside AWS.” — It manages both **AWS and on-premises** (hybrid) instances from one place.
- × “You can reference a Parameter Store SecureString value directly in an SSM document.” — SSM documents currently **do not support SecureString references**; retrieve the value first, then pass it (for example, to Run Command).
- × “CloudFormation applies your edits the moment you change the template.” — It only makes changes **after you decide to run them**; you can preview proposed changes first, and drift detection reports how a stack has diverged from its template.
- × “CloudFormation and SSM templates use a proprietary AWS language.” — They are plain text in **JSON or YAML**.
- × “OpsWorks is a brand-new AWS-only configuration tool.” — It is a configuration management service that provides **managed Chef and Puppet** (three offerings).
- × “Hosting a static website on S3 requires a web or application server.” — A static site has **no server-side processing**; S3 serves the pages directly and avoids costly runtime infrastructure — but you must define an **index document** (default `index.html`).
- × “The S3 website endpoint separator before the Region is always a dash.” — It is a dash **or** a period depending on the Region (dash for US West / Oregon, period for EU / Frankfurt).

08 SELF-QUIZ

answers are upside-down below

Q1 Which Systems Manager feature gives a browser-based shell to an instance without opening inbound ports or managing SSH keys?

Q2 In Patch Manager, what holds the rules that automatically approve or reject patches?

Q3 Systems Manager documents (SSM documents) can be authored in which two formats?

Q4 Which Systems Manager feature stores passwords, keys, and database strings for reference by applications and scripts?

Q5 Which AWS service records the actions taken with Systems Manager so you can audit changes?

Q6 In AWS CloudFormation, what is a “stack”?

Q7 AWS OpsWorks provides managed instances of which two automation platforms?

Q8 Name three of the programming languages for which AWS provides SDKs.

Q9 When hosting a static website on S3, what document must you define, and what is its default name?

Q10 Which AWS service maps a custom domain name to an S3 static-website endpoint using alias records?

ANSWER KEY (rotate the page)
Q1 Session Manager **Q2** a patch baseline **Q3** JSON or YAML **Q4** Parameter Store **Q5** AWS CloudTrail **Q6** a collection of AWS resources created, updated, deleted, and managed as a single unit **Q7** Chef and Puppet **Q8** any three of Java, Python, .NET, JavaScript, Node.js, Ruby, PHP, Go, C++ **Q9** an index document; default `index.html` **Q10** Amazon Route 53