



For cloud architects

Practical guide to the AWS Well-Architected Framework

How to design secure, efficient, and cost-effective workloads in the cloud

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Introduction

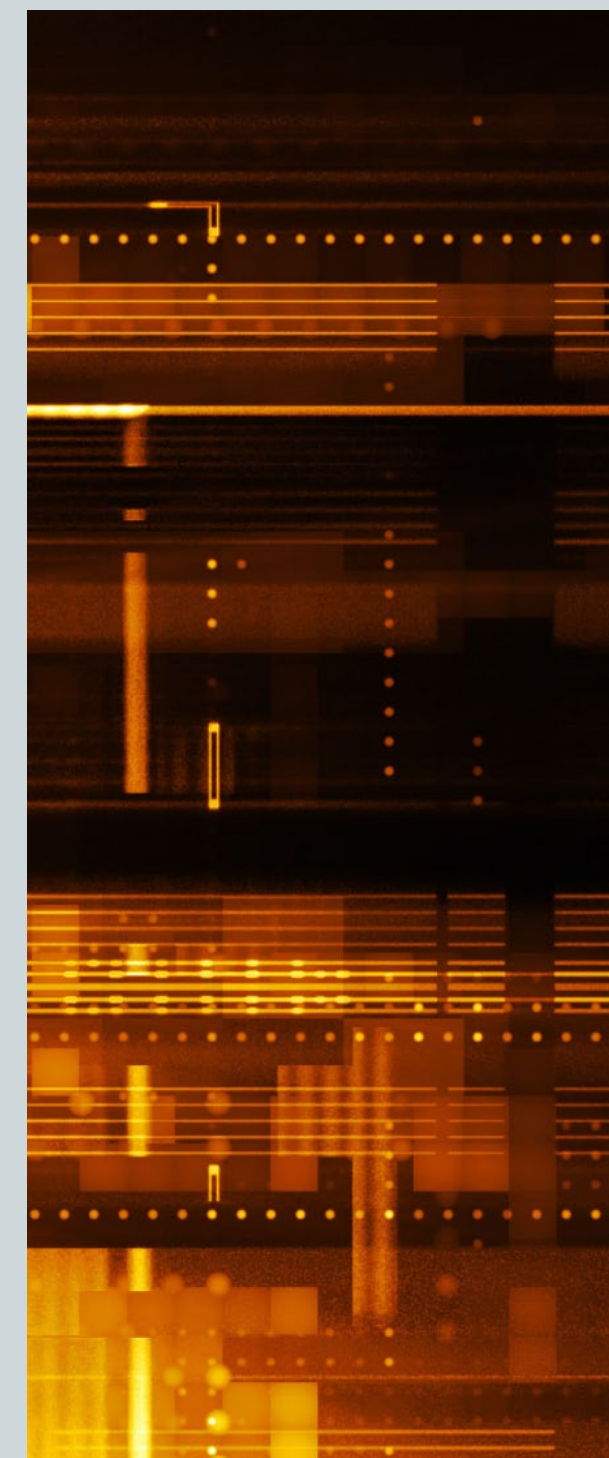
The AWS Well-Architected Framework is a comprehensive and detailed set of best practices for designing and running cloud applications. It was compiled by AWS Solutions Architects who have successfully developed and operated thousands of architectures for customers in every imaginable industry and in every corner of the globe.

The framework is extraordinarily valuable to cloud architect teams or anyone involved in cloud operations, whether you're managing IT for a global organization or moving your company's data protection from on-premises backup to a cloud SaaS solution.

The AWS Well-Architected Framework is big – it's an essential component of AWS Solution Architect certification. However, if you only have a few minutes right now, this eBook is for you. It's a short overview on the design principles detailed in the AWS Well-Architected Framework's five pillars:

- Operational Excellence
- Security
- Reliability
- Performance Efficiency
- Cost Optimization

As you build your data protection strategy for AWS workloads, we hope these insights will empower your cloud architect teams to enable these design principles outlined in the AWS Well-Architected Framework. By doing so, your organization can reduce data risk, keep data secure, focus resources on higher-value functions, and increase predictability of data protection costs – accelerating and protecting your cloud projects.



Pillar 1 – “Operational Excellence”

Run workloads effectively, understand their operations, and continuously improve supporting processes and procedures

Achieving operational excellence depends on understanding that operations are tightly bound to the business and development teams they support. Your approach to building system architecture needs to reflect this interdependence. If it does, you'll provide comprehensive visibility and effective and efficient operation – and event response that continues to improve and support your business goals.

These are five techniques that help grow operational excellence:

- **Perform operations as code** – To reduce the likelihood of human mistakes and set up consistent responses to events, use code to define your resources, applications, and infrastructure.
- **Make frequent, small, reversible changes** – Anticipate a Kaizen approach of continuous improvement to your workloads. Change aspects in small, reversible increments.
- **Refine operations procedures frequently** – Consider your operations procedures as constantly evolving, where you design, test, and repeat often.
- **Anticipate failure** – At some point, all systems break. To test how your workloads and teams will react, hold game days to practice getting back online quickly.
- **Learn from all operational failures** – Keep a log of lessons learned from any unusual event. Communicate the lessons so the entire enterprise benefits.



Watch “Meet the cloud architects – Episode 2 – Operational Excellence”

Pillar 2 – “Security”

Protect data, systems, and assets by taking advantage of cloud technologies

You know large-scale, disruptive events are coming, such as ransomware or a natural disaster. To stay ahead, you need to make sure that your architecture, your workloads, and your cloud accounts are going to be secure, live up to best practices, and meet your own standards and business needs.

The seven design principles for security in the cloud are:

- **Implement a strong identity foundation** — Emphasize “need-to-know,” the principle of least privilege, and consolidate identity management in as few environments as possible.
- **Enable traceability** — Understand what’s going on with automatic systems that monitor data, react to anomalies, and alert you.
- **Apply security at all layers** — Assume your security controls could fail, and that you need backups and multiple layers to survive disruptions.
- **Automate security best practices** — Automate processes and define and manage those processes as code.
- **Protect data in transit and at rest** — Protect your data everywhere, on remote laptops and local servers, and encrypt as needed.
- **Keep people away from data** — Process data in a way that minimizes visibility and find methods to run procedures automatically.
- **Prepare for security events** — Be ready for the unexpected with approved processes and policies.



Watch “Meet the cloud architects – Episode 3 – Security”

Pillar 3 – “Reliability”

Ensure workloads perform consistently

If a component fails, can it heal itself? Can something else take over? Reliability means that a workload is performing its intended function, and that you can operate and test it through its total lifecycle. You need to set up network topologies that can handle changing workloads without missing a productive beat. As with all the pillars, you have to weigh business value in all your designs. In practice, some workloads require more reliability than others.

To minimize disruptions and automatically take care of changes in demand or requirements:

- **Automatically recover from failure** – Use key performance indicators (KPIs) to set thresholds and automated responses. Prioritize them based on business value considerations.
- **Test recovery procedures** – Simulate or recreate different failures in the cloud. You’ll be able to see and fix failure pathways before valuable workloads are interrupted.
- **Scale horizontally to increase aggregate workload availability** – Reduce single points of failure. Replicate smaller resources rather than depend on one large resource.
- **Stop guessing capacity** – Minimize over- and under-provisioning by automating the scaling of cloud resources to satisfy demands.
- **Manage change in automation** – Set up monitoring to track and review change procedures to ensure workloads aren’t adversely affected.



Watch “Meet the cloud architects – Episode 4 – Reliability”

Pillar 4 – “Performance Efficiency”

Run components that maintain performance as demands change and technologies evolve

Using a data-driven approach, you can build a high-performing architecture that keeps your workloads performing cost-effectively at their best. Metrics are the only real way to understand the costs of your compute, storage, database, and network resources, and monitoring is the only way to track performance and deviations. Along with this visibility, well-architected workloads typically use multiple solutions to drive their processes, combining a number of different architectural approaches (for example, event-driven, ETL, or pipeline).

To design for the greatest performance efficiency:

- **Democratize advanced technologies** – Delegate specialized services to a SaaS provider. Do what you’re best at for your business and let other experts take care of what they’re best at.
- **Go global in minutes** – Leveraging multiple AWS regions in the cloud gives your applications lower latency, while delivering a better customer experience and lower costs.
- **Use serverless architectures** – Instead of managing physical servers, lower transaction costs by using cloud backend providers (BaaS).
- **Experiment more often** – Perform comparative testing in the cloud on a regular basis to optimize and balance instances, storage, and configurations.
- **Consider mechanical sympathy** – Align your workload goals with the technologies you choose. For example, consider data access patterns when you select database or storage approaches.



Watch “Meet the cloud architects” –
Episode 5 – Performance Efficiency”

Pillar 5 – “Cost Optimization”

Run systems that deliver business value at the lowest price point

Do you understand the actual costs of your workloads? Are you consistently adjusting how you're paying for your resources and your architecture? Your decisions about allocating budget require accurate cost attribution to know what's profitable and what's waste. What's more, you need to make sure you're paying for services you're actually using and not over-provisioning resources.

Consider patterns of usage, the time it takes to provision new resources, and the predictability of demand patterns. Make sure you have correctly sized queues or buffers, and that your processes react to changes in workload demand in a timely fashion.



Watch “Meet the cloud architects – Episode 6 – Cost Optimization”

The AWS Well-Architected Framework design principles for cost optimization include:

- **Implement Cloud Financial Management** – AWS cost management services give you the tools and resources to track and understand all the expenses involved in running your cloud application.
- **Adopt a consumption model** – Paying-as-you-go with SaaS resources means your costs scale to actual usage. Otherwise, you're estimating demand, typically including a fudge factor, and then paying extra for whatever's unused.
- **Measure overall efficiency** – Use metrics to track business output from workloads and all the various expenses they're generating. Know your gains vs. your costs.
- **Stop spending money on undifferentiated heavy lifting** – Let your cloud service manage operating systems and applications while you focus on your business.
- **Analyze and attribute expenditures** – Accurately understand the return on investment (ROI) for different workloads to drive optimization and reduce costs.

Next steps

Building cloud architectures for business applications is complex, as evidenced by the AWS Well-Architected Framework, of which this eBook is just a brief sneak peek. But it doesn't have to be difficult for you.

Cloud-native service providers like AWS and SaaS vendors like Druva were born in the cloud and live in the cloud, and they understand these methodologies inside and out. Their business models are built on providing products and services that let you focus on your enterprise specialty rather than generic, backend tasks. Their solutions are founded on your connecting to the cloud rather than buying and operating hardware.

Your business relies on data, and Druva SaaS brings the simplicity and scale of the cloud to data protection and management. Druva is built on AWS and it's a model for the AWS Well-Architected Framework. Leveraging Druva, a cloud-based data protection service, ranging from backup/recovery to providing cyber resilience, your teams can not only reduce data risks, but can achieve the following:

- **Enable a single, comprehensive data protection strategy that follows best practices**
- **Increase predictability of data protection costs**
- **Support new workloads and cloud initiatives**
- **Meet compliance requirements based on industry standards**
- **Deliver expected SLAs**



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Resources

“Meet the cloud architects” is our webinar series that discusses Druva SaaS in the context of the five pillars of the AWS Well-Architected Framework. Each episode focuses on one of the five pillars, particularly from the standpoint of enterprise data protection.

For more details about the AWS Well-Architected Framework:

- Visit the [AWS Well-Architected homepage](#).
- The [AWS Well-Architected Tool](#) provides a consistent process for you to review and measure your architecture.
- The [AWS Well-Architected Labs](#) provides a repository of code and documentation to help you apply best practices.
- [AWS Well-Architected Partner program](#) members have deep AWS knowledge and can help you review and improve your workloads.

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