# Understanding the Feature

Last updated by | Vitor Tomaz | Jun 8, 2022 at 5:33 AM PDT

## Understanding the Feature

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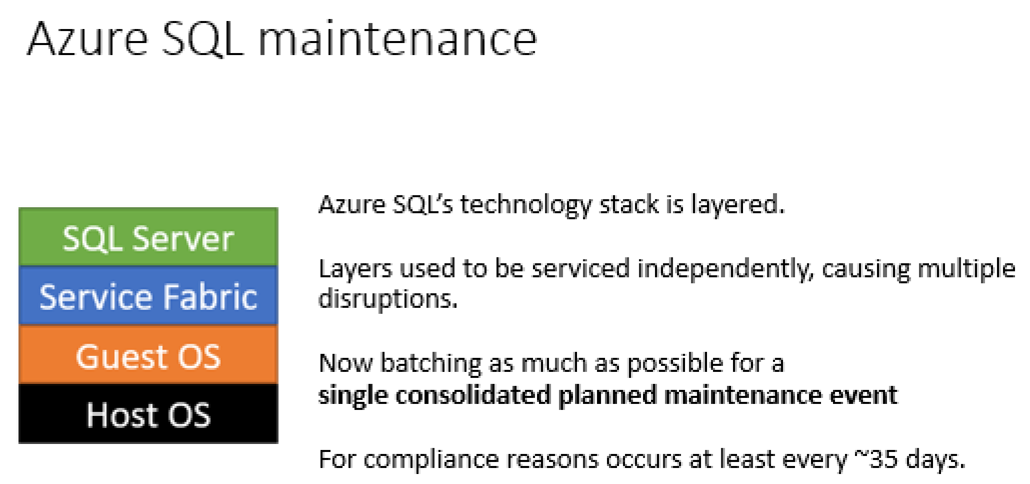
## CSS Mentoring Series Maintenance Windows & Advance Notification

Deck

Recording : Here

## How Azure SQL Maintenance works



Azure SQL maintenance

SQL Server

Service Fabric

Guest OS

Host OS

Azure SQL's technology stack is layered.

Layers used to be serviced independently, causing multiple disruptions.

Now batching as much as possible for a **single consolidated planned maintenance event**

For compliance reasons occurs at least every ~35 days.

Maintenance of Azure SQL service is done through infra, SF, App and HostOS updates. These updates cause short data access interruptions to our customers. In industries like online gaming such interruptions can harm end-user experience if the time of maintenance is not under customer's control.

When running IT systems on-premises, one might try to ensure perfect availability by having best hardware, locking up the server room and throwing away the key. IT would traditionally prevent as much change as possible — avoiding applying updates to the operating system or applications because they're too critical, and pushing back on change requests from users. It affects continued system improvement, and sometimes even compromises security for systems that are deemed too crucial to patch regularly.

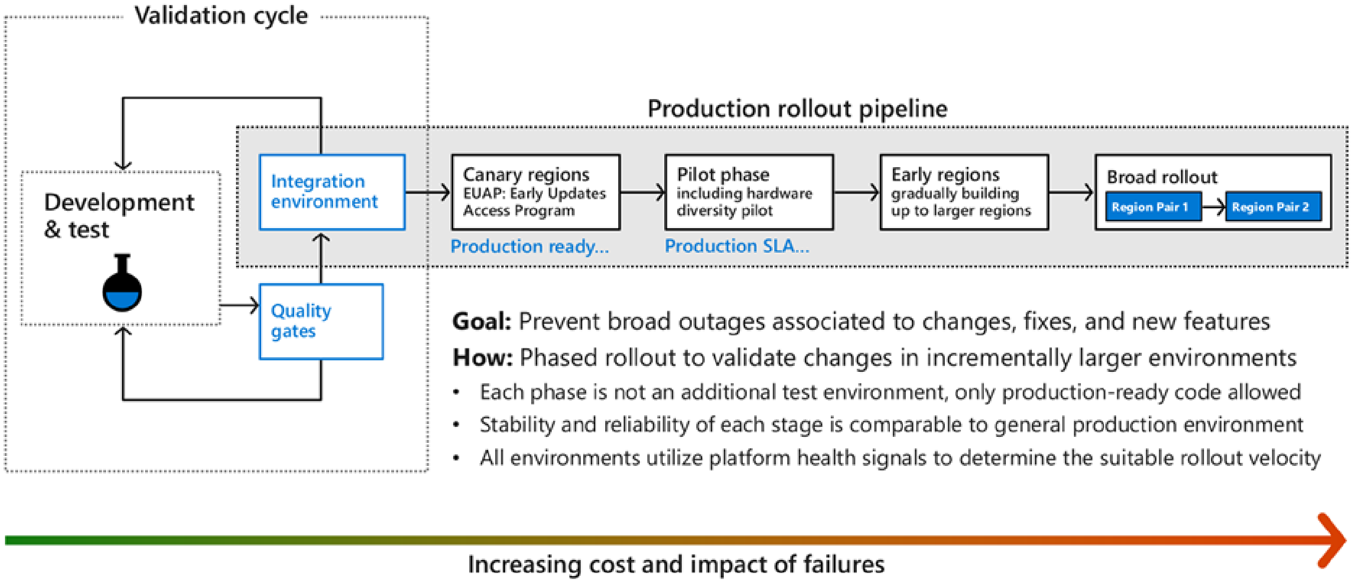
This approach simply doesn't work for change and release management in a public cloud like Azure. Change is both inevitable and beneficial, given the need to deploy service updates and improvements, and given our commitment to you to act quickly in the face of security vulnerabilities. As we can't simply avoid change, we, our customers, and our partners need to acknowledge that change is expected, and we plan for it. Of course, we continue to work on making updates as transparent as possible and will deploy the changes safely. Having said that, our customers and partners should also design for high availability wherever possible.

## Safe Deployment Practices

Teams across Azure follow similar processes to prevent or at least minimize impact related to changes. Firstly, by ensuring that changes meet the quality bar before the deployment starts, through test and integration validations. Then after sign off, we roll out the change in a gradual manner and measure health signals continuously, so that we can detect in relative isolation if there is any unexpected impact associated with the change that did not surface during testing. We do not want a change causing problems to ever make it to broad production, so steps are taken to ensure we can avoid that whenever possible. The gradual deployment gives us a good opportunity to detect issues at a smaller scale (or a smaller 'blast radius') before it causes widespread impact.

Azure approaches change automation, aligned with the high level process above, through a safe deployment practice (SDP) framework, which aims to ensure that all code and configuration changes go through a lifecycle of specific stages, where health metrics are monitored along the way to trigger automatic actions and alerts in case of any degradation detected. These stages (shown in the diagram that follows) reduce the risk that software changes will negatively affect your existing Azure workloads.

A diagram showing how the cost and impact of failures increases throughout the production rollout pipeline, and is minimized by going through rounds of development and testing, quality gates, and integration.



**Goal:** Prevent broad outages associated to changes, fixes, and new features

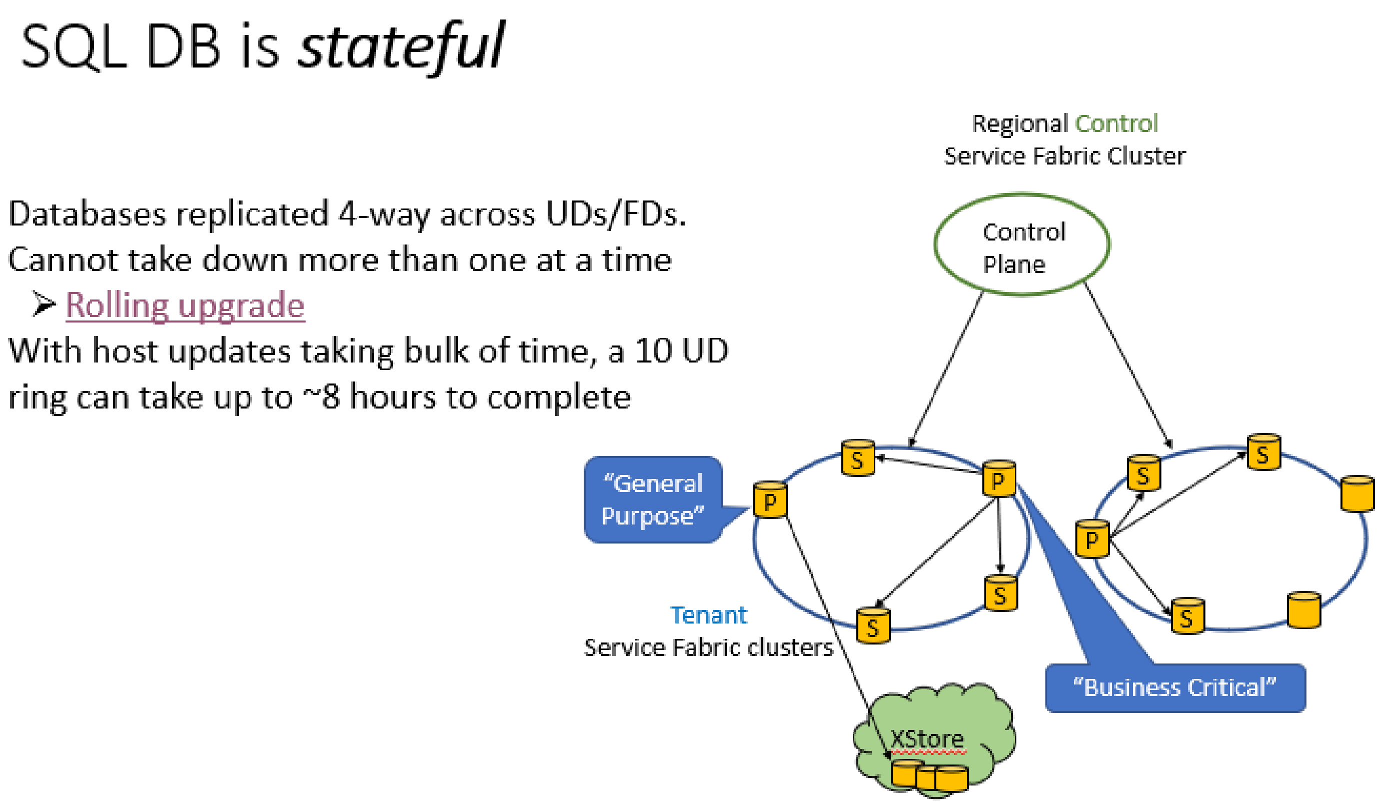
**How:** Phased rollout to validate changes in incrementally larger environments

- Each phase is not an additional test environment, only production-ready code allowed
- Stability and reliability of each stage is comparable to general production environment
- All environments utilize platform health signals to determine the suitable rollout velocity

## Stateless versus Stateful service

Stateless: Easier to scale, provide redundancy, fail over....

Stateful : SQL DB is stateful

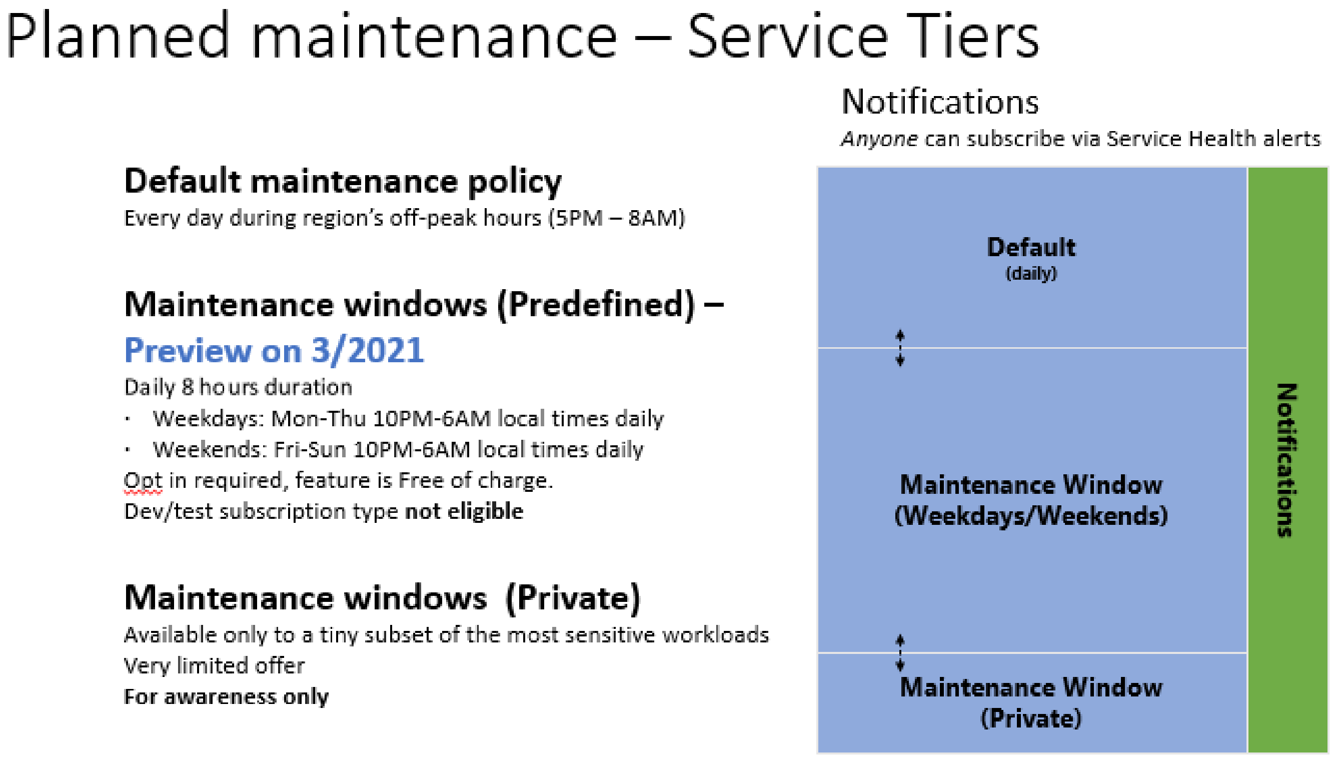


SQL DB is *stateful*

- Databases replicated 4-way across UDs/FDs.
- Cannot take down more than one at a time
  - ➢ Rolling upgrade
- With host updates taking bulk of time, a 10 UD ring can take up to ~8 hours to complete

Read more about Rolling upgrade here

## Planned Maintenance Preview



# Planned maintenance – Service Tiers

### Notifications

*Anyone* can subscribe via Service Health alerts

### Default maintenance policy

Every day during region's off-peak hours (5PM – 8AM)

### Maintenance windows (Predefined) – Preview on 3/2021

Daily 8 hours duration

- Weekdays: Mon-Thu 10PM-6AM local times daily
- Weekends: Fri-Sun 10PM-6AM local times daily

Opt in required, feature is Free of charge.
Dev/test subscription type **not eligible**

### Maintenance windows (Private)

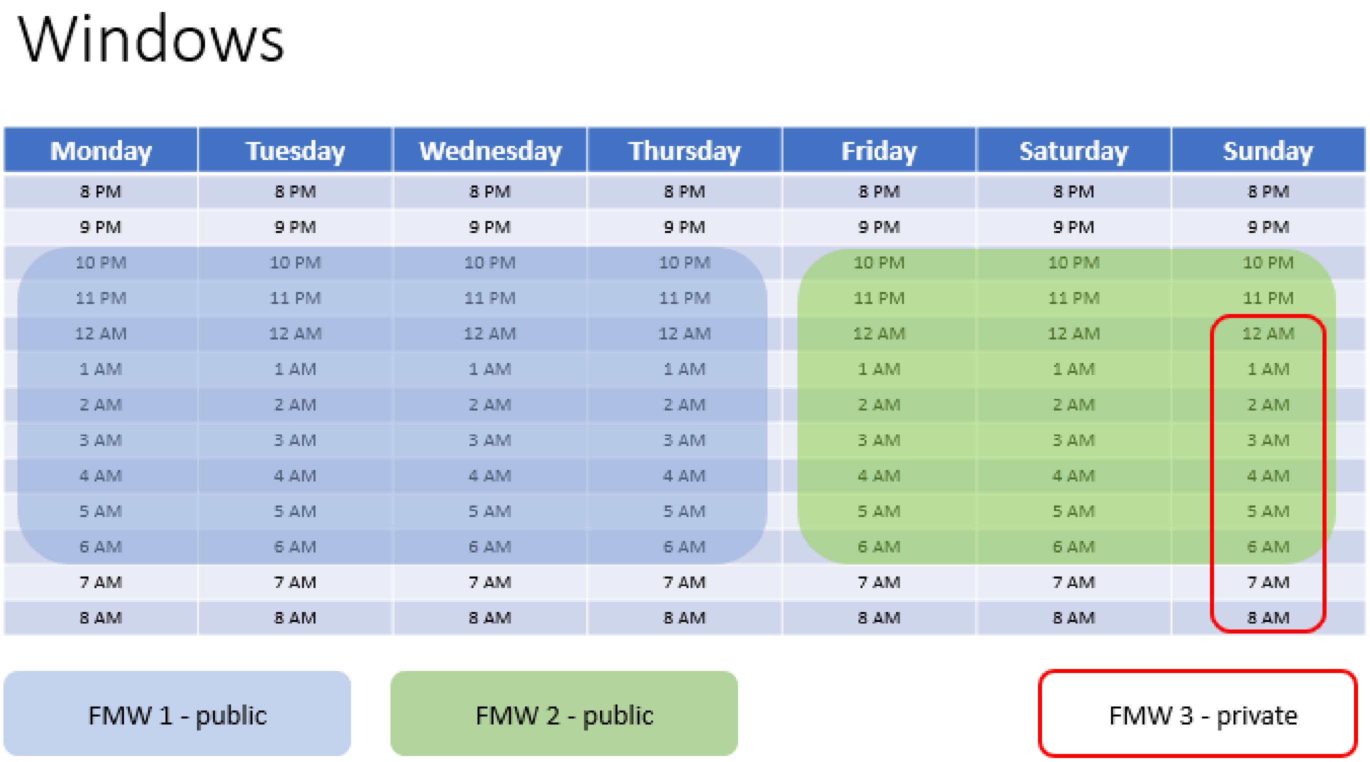
Available only to a tiny subset of the most sensitive workloads
Very limited offer
**For awareness only**

NOTE: In the below picture the FMW window is wrongly depicted.

- Default window, 5PM to 8AM local time Monday - Sunday
- Weekday window, 10PM to 6AM local time Monday – Thursday
- Weekend window, 10PM to 6AM local time Friday - Sunday

## Maintenance windows (Private)

Available only to a tiny subset of the most sensitive workloads Very limited offer **For awareness only** *do not directly discuss with customer*



# Windows

| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|
| 8 PM | 8 PM | 8 PM | 8 PM | 8 PM | 8 PM | 8 PM |
| 9 PM | 9 PM | 9 PM | 9 PM | 9 PM | 9 PM | 9 PM |
| 10 PM | 10 PM | 10 PM | 10 PM | 10 PM | 10 PM | 10 PM |
| 11 PM | 11 PM | 11 PM | 11 PM | 11 PM | 11 PM | 11 PM |
| 12 AM | 12 AM | 12 AM | 12 AM | 12 AM | 12 AM | 12 AM |
| 1 AM | 1 AM | 1 AM | 1 AM | 1 AM | 1 AM | 1 AM |
| 2 AM | 2 AM | 2 AM | 2 AM | 2 AM | 2 AM | 2 AM |
| 3 AM | 3 AM | 3 AM | 3 AM | 3 AM | 3 AM | 3 AM |
| 4 AM | 4 AM | 4 AM | 4 AM | 4 AM | 4 AM | 4 AM |
| 5 AM | 5 AM | 5 AM | 5 AM | 5 AM | 5 AM | 5 AM |
| 6 AM | 6 AM | 6 AM | 6 AM | 6 AM | 6 AM | 6 AM |
| 7 AM | 7 AM | 7 AM | 7 AM | 7 AM | 7 AM | 7 AM |
| 8 AM | 8 AM | 8 AM | 8 AM | 8 AM | 8 AM | 8 AM |

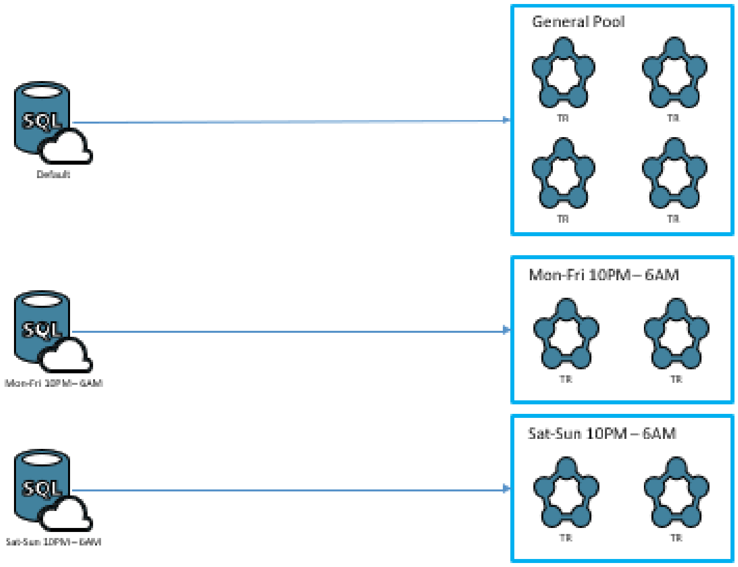
FMW 1 - public

FMW 2 - public

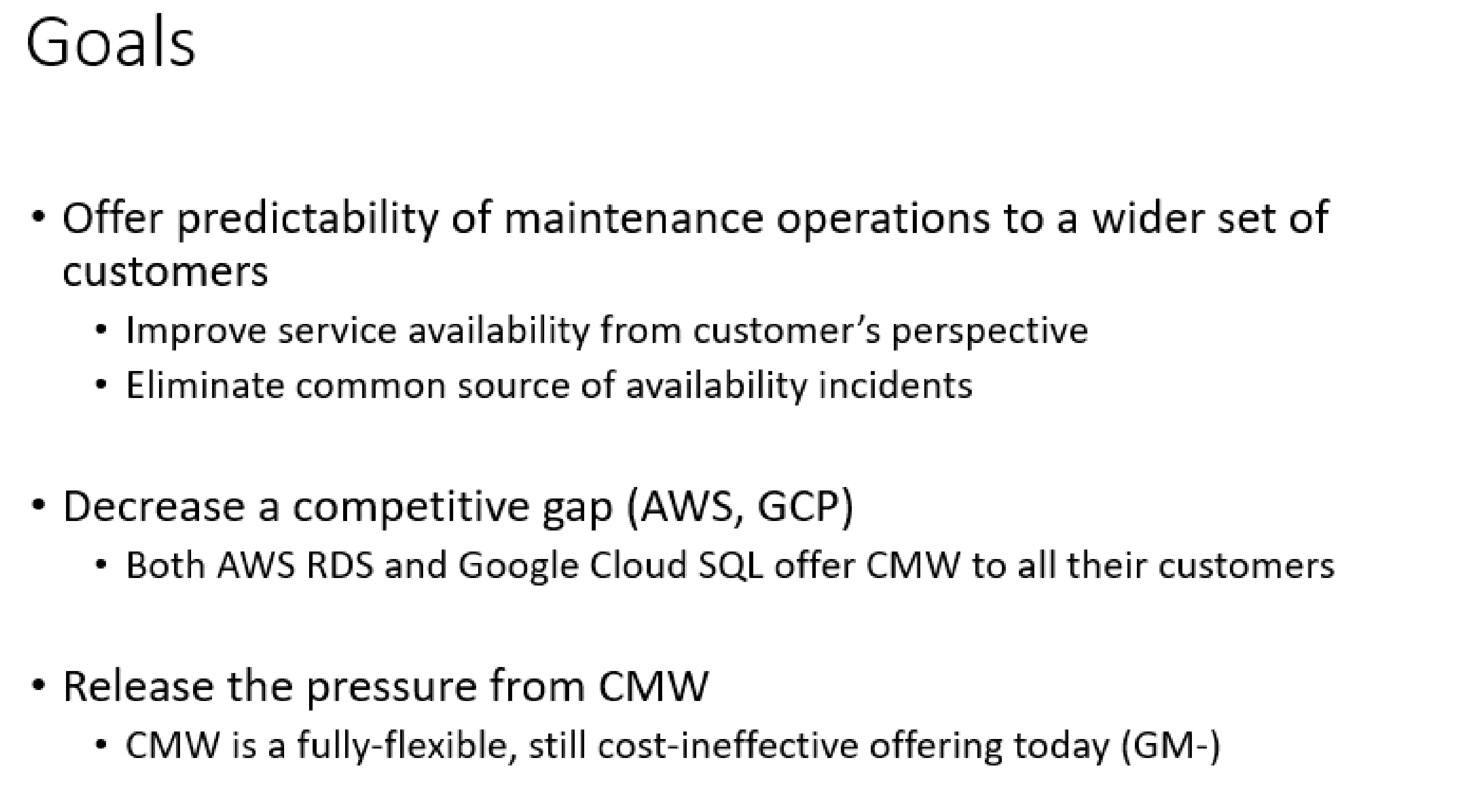
FMW 3 - private

# SQL DB and SQL MI: Maintenance Window

- Group SF clusters by window and place DB according to selection
  - Upgrade clusters on that schedule
- Does not protect from *all* load balancing/defrag related failovers
- **Public Preview on 3/2**



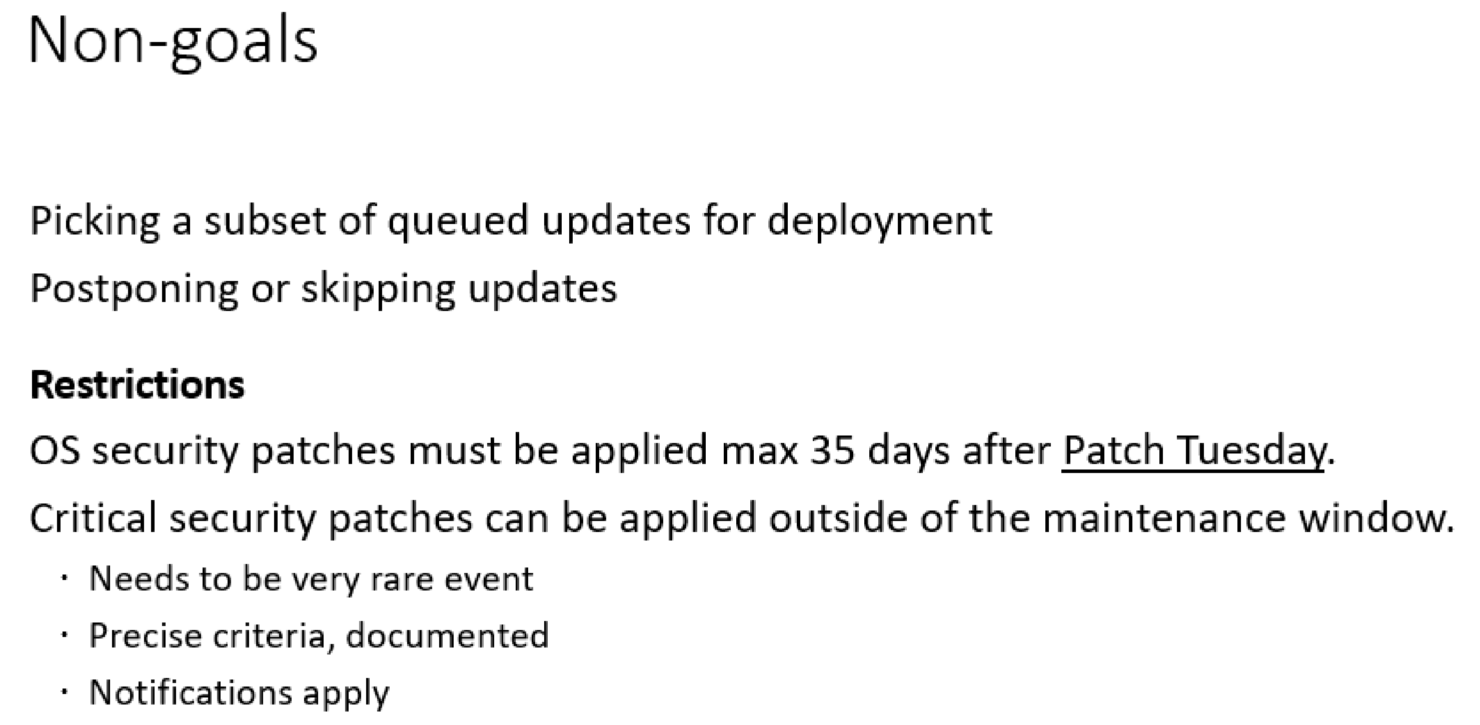
## Goals & Non Goals for this feature



# Goals

- Offer predictability of maintenance operations to a wider set of customers
  - Improve service availability from customer’s perspective
  - Eliminate common source of availability incidents
- Decrease a competitive gap (AWS, GCP)
  - Both AWS RDS and Google Cloud SQL offer CMW to all their customers
- Release the pressure from CMW
  - CMW is a fully-flexible, still cost-ineffective offering today (GM-)

Versus



# Non-goals

Picking a subset of queued updates for deployment

Postponing or skipping updates

**Restrictions**

OS security patches must be applied max 35 days after Patch Tuesday.

Critical security patches can be applied outside of the maintenance window.

- Needs to be very rare event
- Precise criteria, documented
- Notifications apply

## Feature Summary

| Topic | Details |
|---|---|
| Initial Regions Supported | [https://docs.microsoft.com/en-us/azure/azure-sql/database/maintenance-window-faq#in-which-regions-is-choosing-a-maintenance-window-available](https://docs.microsoft.com/en-us/azure/azure-sql/database/maintenance-window-faq#in-which-regions-is-choosing-a-maintenance-window-available) |
| UI, API Support | Yes |
| SLOs Supported | [https://docs.microsoft.com/en-us/azure/azure-sql/database/maintenance-window-faq#in-which-service-level-objectives--slos--can-i-choose-a-maintenance-window](https://docs.microsoft.com/en-us/azure/azure-sql/database/maintenance-window-faq#in-which-service-level-objectives--slos--can-i-choose-a-maintenance-window) |
| | |
| Eligibility | [https://docs.microsoft.com/en-us/azure/azure-sql/database/maintenance-window-faq#what-is-the-pricing-for-maintenance-window](https://docs.microsoft.com/en-us/azure/azure-sql/database/maintenance-window-faq#what-is-the-pricing-for-maintenance-window) (All paid subscriptions can use this feature) |
| Maintenance Window Per region | Min of 2 window per region to start with in all hero regions |
| Resource Onboarding | DB or EP Level |
| FMW Duration per Window | 8 hours |
| Billing / Monetization | Free to customers |
| Scheduling: Ability to Configure Dates & Times | Not Supported. Subject to updates on any day. Time window fixed. |
| Scheduling: Upgrade Me Now | Not Supported. |
| Notification | 24 hour prior to FMW |

**How good have you found this content?**

☺ ☹