

<b>Title of Change:</b>	Upcoming System Model H1 hardware changes
<b>Proposed Date of Change:</b>	September 2021
<b>Contact Information:</b>	Technical: Brian Neyenhuis All other: Jenni Strabley
<b>Products impacted</b>	H1-1 and H1-2
<b>Changes to product data sheet</b>	<b>NO</b> <input checked="" type="checkbox"/> <b>YES</b> <input type="checkbox"/>
<b>Changes to subscription contract</b>	<b>NO</b> <input checked="" type="checkbox"/> <b>YES</b> <input type="checkbox"/>
<b>Description and Purpose:</b>	The purpose of this notification is <ol style="list-style-type: none"> <li>1) Notify customers that hardware H1-2 is coming on-line. All customers with existing H1 subscription will now have access to both H1-1 and H1-2</li> <li>2) Notifying customers that the queuing submission process will be changing to enable customers to submit queued jobs to a specific machine (H1-1 or H1-2)</li> <li>3) Alert customers of upcoming extended upgrade cycle for H1-1</li> </ol> <p>See additional information below for more details on the above bullets</p>
<b>Reason / Motivation for Change:</b>	Customer notification
<b>Action required by customers</b>	None

Additional Information:

**1) Notification of Hardware H1-2 coming on-line**

In September we will be launching a second machine to the System Model H1 service, machine H1-2. H1-2 uses the same linear trap as H1-1 and is being launched to provide more availability for customer usage. H1-1 and H1-2 will use the same data sheet. Honeywell will make reasonable commercial efforts to make H1-1 and H1-2 very close in performance but given the intermittent upgrade cycles deployed on the systems, it is inevitable that at any time H1-1 and H1-2 may have different capabilities and slight differences in noise and error sources. As a specific example, H1-2 will launch with N=10 qubits; H1-1 currently is compatible with using up to N=12 qubits. We expect H1-2 to be upgraded to N=12 qubits in mid-Q4 2021.

The availability of H1-1 and H1-2 will be staggered throughout a month to allow for upgrade cycles while giving customers more access to the machine. Customers shall consult the user portal for more information on when each machine will be available.

For customers that have reserve time, H1-1 machine will be used to fulfill those reserved time slots. H1-1 and H1-2 will both be used for running queued jobs. Reserve time will not be run on H1-2.

In summary, the impact to customers of launching H1-2 is:

- Customers will see more availability for queued-access service on System Model H1 machines

- H1-2 will launch with N=10 qubits while H1-1 currently is compatible with N=12 qubits. Jobs that use  $N > 10$  qubits will not be able to run on H1-2 and an error code will be returned at the API validator. Jobs that use  $N \leq 10$  qubits can be run on either machine.

## 2) Change to Queuing submission process

Customers will be able to submit to a specific machine (H1-1 or H1-2) or submit to the “machine family”. Submission to the “machine family” enables the customer submitted job to run on the first available, compatible machine. The only condition for compatibility is number of qubits. If customers submit a job to a specific machine that is not available, the jobs will remain at the top of an organization’s queue until that machine is available.

The family submission can be chosen by setting `machine=HQS-LT`. Customers' ability to submit to individual machines remains unchanged using `machine=HQS-LT-S1` or `machine=HQS-LT-S2` for H1-1 and H1-2, respectively.

The ‘batching’ feature is only used when submitting to specific machines and is not compatible with machine family submissions.

In summary, the impact to customers of the change to the queuing submission process

- Customers will see more options for submitting jobs to the queue
- Customers have the option to submit to the machine family to access to the first available, compatible machine.
- Customers must submit jobs to an individual machine to be processed during its reservation. A reserved machine will not pull jobs from the family submission.

## 3) Alert customers of upcoming extended upgrade cycle for H1-1

H1-1 is tentatively scheduled to be taken offline October 17 - November 15 for an extended upgrade cycle, subject to development schedule changes. The purpose of this upgrade is to install new optics to enable a forthcoming upgrade to expand the number of qubits available in H1-1 from N=12 to N=20. On this schedule, the tentative commercially available times for H1-1 and H1-2 are shown on the calendars below.

Tentatively scheduled available dates :

OCTOBER 2021						
SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
		H1-1 available				
10	11 Columbus Day	12	13	14	15	16
		H1-1 available				
17	18	19	20	21	22	23
		H1-2 available				
24	25	26	27	28	29	30
		H1-2 available				
31 Halloween						

NOVEMBER 2021						
SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7 End Daylight Savings	8	9	10	11 Veterans Day	12	13
		H1-2 available				
14	15	16	17	18	19	20
		H1-1 available				
21	22	23	24	25 Thanksgiving Day	26 Black Friday	27
		H1-1 available				
28	29	30				

Customers with reserve time should plan to schedule their reserve sessions during H1-1 operations. Queued access will be available during H1-1 and H1-2 operations. Emulator access is available to assist customer development and not impacted by upgrade schedules.

In summary, the impact to customers of tentatively planned extended upgrade time for H1-1

- H1-1 will be unavailable October 17 – November 15 but will be available in the early parts of October and the later parts of November for customer access.
- Customers are encouraged to use queued access from H1-2 and the emulator to minimize the impact of H1-1 extended upgrade.