Updates to Scheduled Traffic State Machines to Support 802.1Qbu Frame Preemption

- Supplement for P802.1Q-rev D2.1 comments -

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Overview

- **This proposal was first presented in 802.1 TSN TG conference call, Oct. 16, 2017.**

- **During 802.1 plenary meeting, Nov. 2017,**
  - **It was agreed that the problem existed and current text might need changes.**
  - **Comments raised at the meeting:**
    - Clarification on time instance of issuing *hold/release* by adding a timing diagram
    - Consideration on an alternative approach that "management/operator" pre-determines when to issue *hold/release* and the operation name of a time slot is aligned with the hold/release status effective at that time slot.
  - **Slides presented at Nov. plenary are available at:**
    - *http://www.ieee802.org/1/files/public/docs2017/q-rev-kang-comment-bv-state-mahchine-1117-v01.pdf*

- **This document provides additional information to resolve the comments.**

Example of timing diagrams for Option A & Option B

Gate Control List (Option A: Proposal)

Gate Operation/ Parameters	GateState								Time Interval
	7	6	5	4	3	2	1	0	
T00 SetGateStates	o	C	C	C	C	C	C	o	62.5us
T01 Set-And-Hold-MAC	C	C	C	C	C	C	C	o	62.5us
T02 Set-And-Release-MAC	o	C	C	C	C	C	C	o	62.5us
T03 SetGateStates	C	C	C	C	C	C	C	o	62.5us

Gate Control List (Option B: Comment)

Gate Operation/ Parameters	GateState								Time Interval
	7	6	5	4	3	2	1	0	
T00 SetGateStates	o	C	C	C	C	C	C	o	62.5us
T01 SetGateStates	C	C	C	C	C	C	C	o	62.5us
T02 Set-And-Hold-MAC	o	C	C	C	C	C	C	o	62.5us
T03 Set-And-Release-MAC	C	C	C	C	C	C	C	o	62.5us

C= closed, o=open
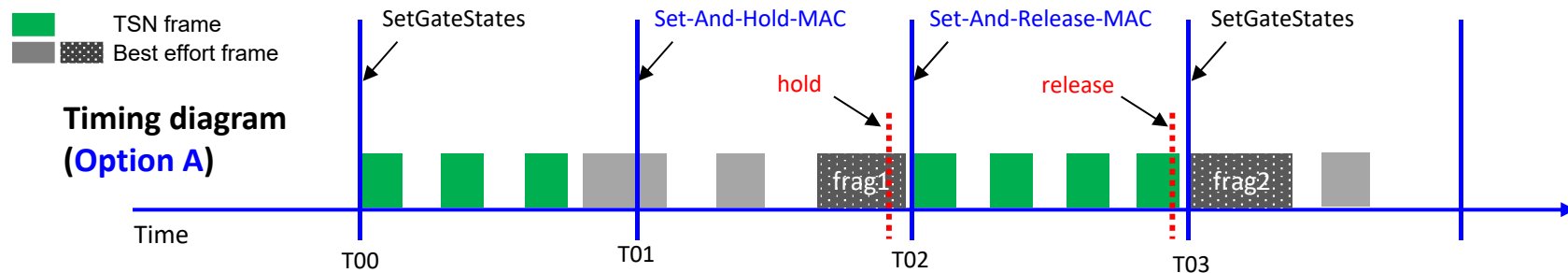
Option A issues the hold/release to underlying MAC **during** Set-And-Hold-MAC/Set-And-Release-MAC gate operation
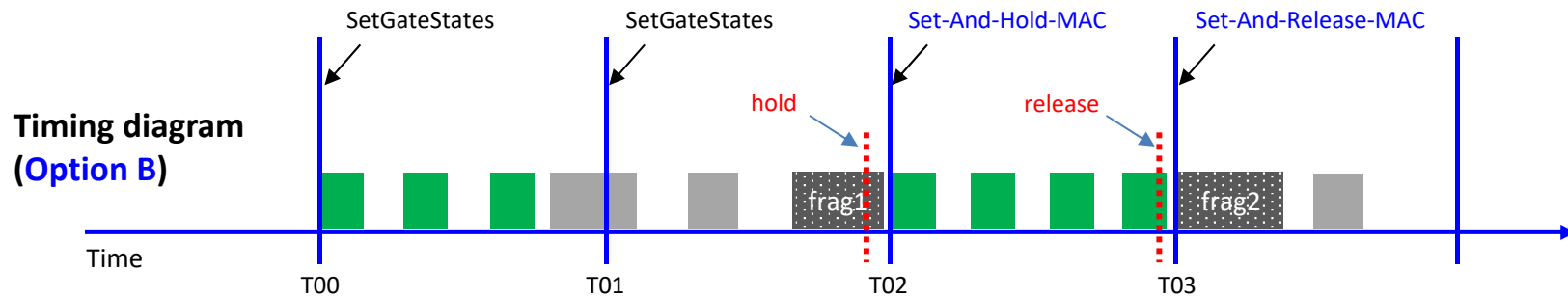
Option B issues the hold/release to the underlying MAC **before** Set-And-Hold-MAC/Set-And-Release-MAC gate operation

Rationale for Option A

We think that option A is correct based on existing text in 802.1Q and our observation given below.

❖ **Existing text:**

12.30.1.5 holdRequest object

P802.1Q-Rev D2.1, p.402

The holdRequest object contains an enumerated integer value, with *hold (1)* indicating that a Set-And-Hold-MAC gate operation (8.6.8.4, Table 8-6) has been executed, and *release (2)* indicating that a Set-And-Release-MAC gate operation has been executed. This object exists per Port.

6.7.1 Support of the ISS by IEEE Std 802.3 (Ethernet)

P802.1Q-Rev D2.1, p.76

If the value of the holdRequest managed object (12.30.1.5) transitions from *release (2)* to *hold (1)*, a MM_CTL.request(hold_req) primitive is issued to the underlying IEEE 802.3 MAC, with a hold_req parameter value of HOLD, as described in Clause 99 of IEEE Std 802.3br. If the value of the holdRequest managed object (12.30.1.5) transitions from *hold (1)* to *release (2)*, a MM_CTL.request(hold_req) primitive is issued to the underlying IEEE 802.3 MAC, with a hold_req parameter value of RELEASE.

❖ **Observation:**

- ▪ **The hold or release signal is generated when the holdRequest managed object value changes.**
- ▪ **The holdRequest managed object value is changed when the Set-And-Hold-MAC or Set-And-Release-MAC gate operation has been executed.**

Proposed modifications for Option A
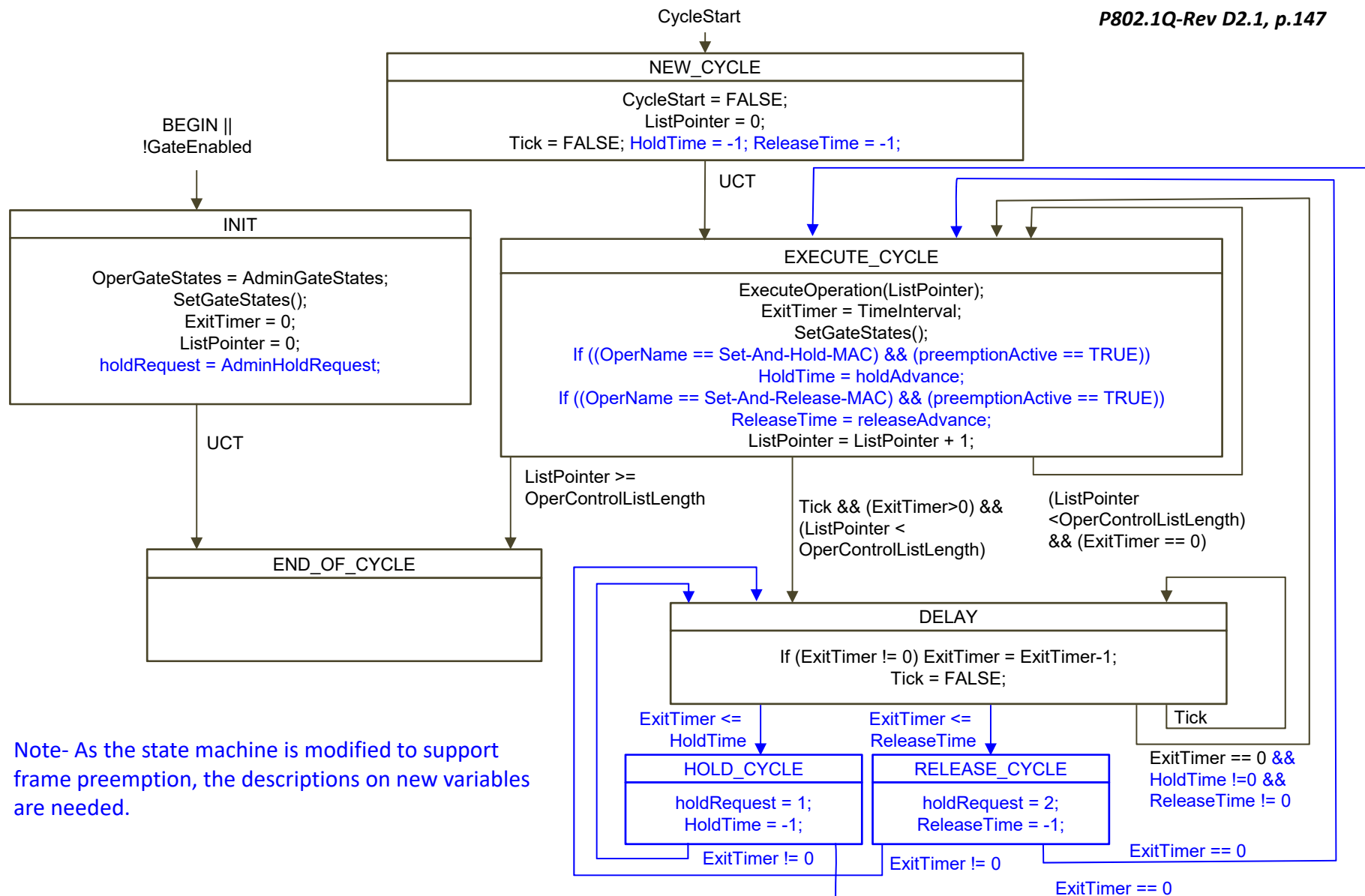
Figure 8-16—List Execute state machine

Nevertheless, if meeting concludes that gate operation for frame preemption should follow option B, further consideration should be given and modification is required as shown in the next slides.

# How to reflect Option B to 802.1Q

- **It is not obvious how management/administrator can (pre)configure the time instances of issuing the hold or release signals.**

- **802.1Q needs to describe**
  - **how to determine the time instance of issuing the hold or release signal, and**
  - **how to make the operation name aligned with the hold/release status effective at that time slot.**

- **The following modifications can be done to 802.1Q:**
  - **Modify the corresponding state machines.**
  - **Change the definition of the holdRequest managed object.**
    - *** See the next slides for the required modifications.**

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Required modifications for option B (1/3)

P802.1Q-Rev D2.1, p.147
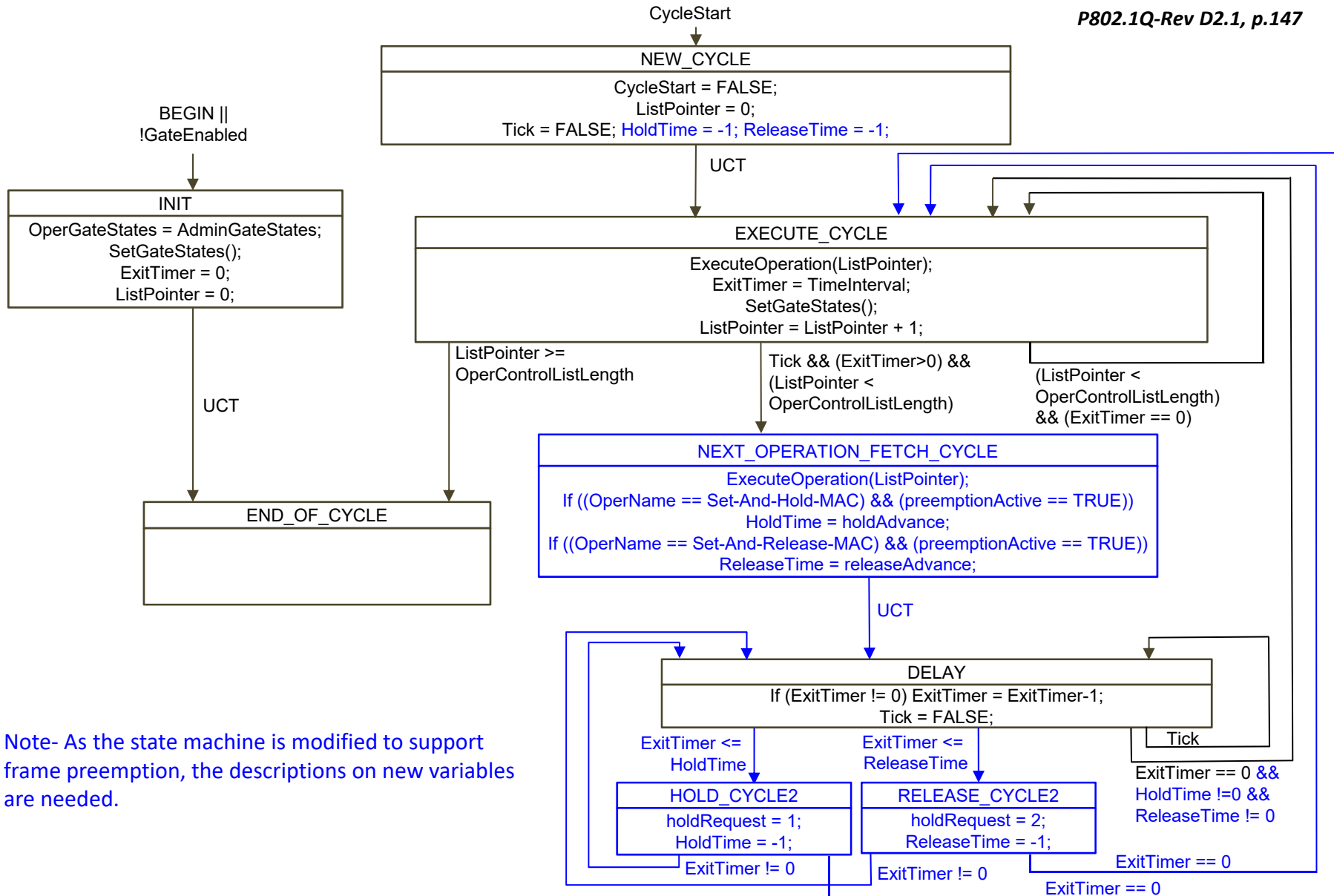
Figure 8-16—List Execute state machine
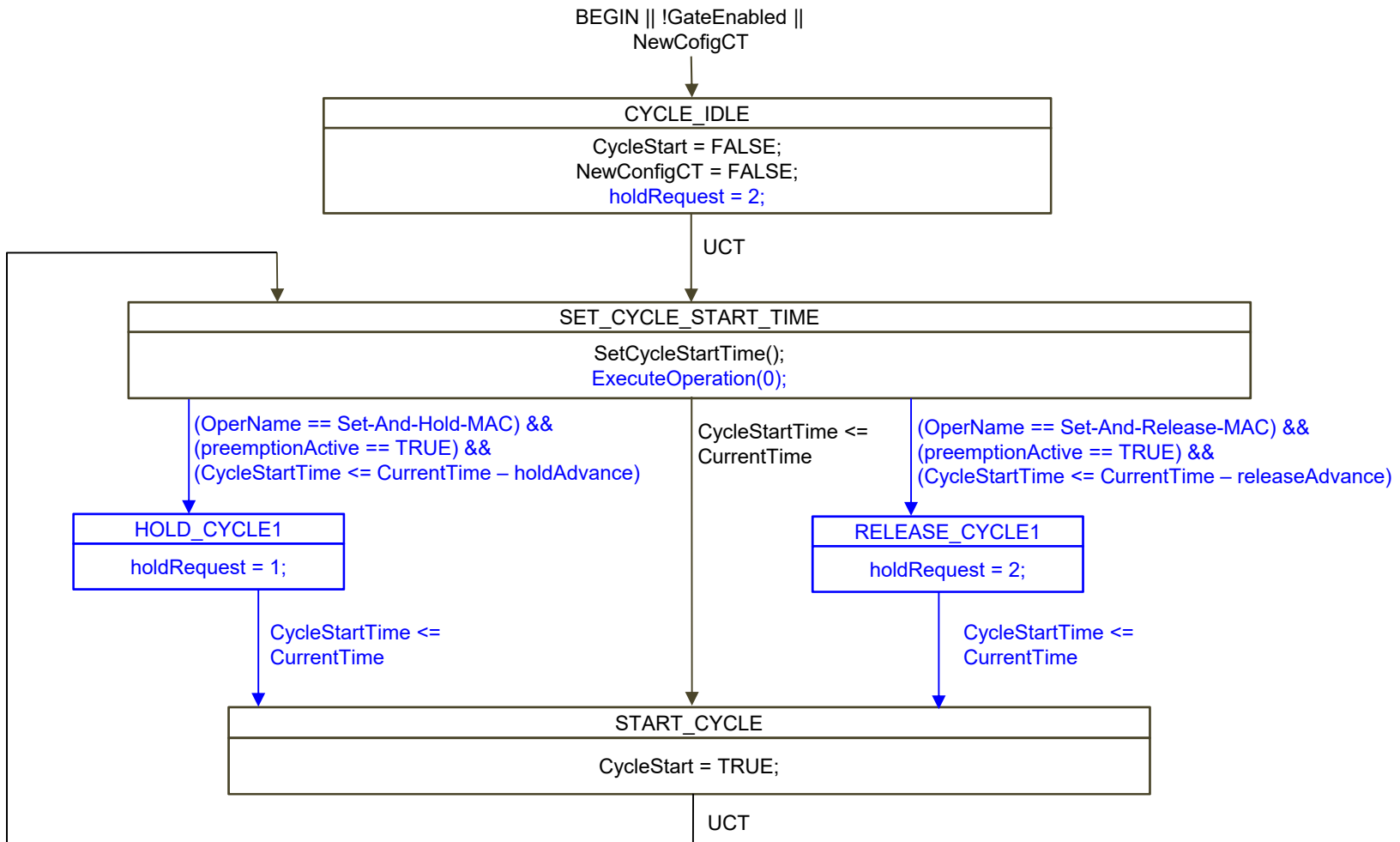
Required modifications for option B (2/3)

Figure 8-15—Cycle Timer state machine

Required modifications for option B (3/3)

- **Change the text of 12.30.1.5 holdRequest managed object as following:**

12.30.1.5 holdRequest object   *P802.1Q-Rev D2.1, p.402*

The holdRequest object contains an enumerated integer value, with *hold (1)* indicating that a Set-And-Hold-MAC gate operation (8.6.8.4, Table 8-6) ~~has been executed~~, and *release (2)* indicating that a Set-And-Release-MAC gate operation ~~has been executed~~. This object exists per Port.

will be executed as next gate operation.