FRER Sequence Recovery Reset Cases

Johannes Specht

In support of discussions on WG 802.1 Maintenance Item #378

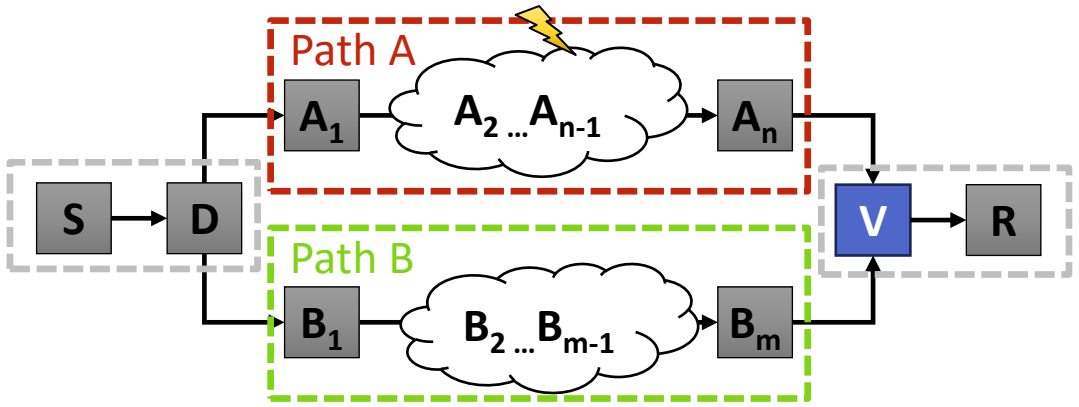
Introduction

- IEEE WG 802.1 Maintenance Item #378 (https://www.802-1.org/items/486) and associated discussions suggest to modify the reset behavior of IEEE Std 802.1CB‘s VectorRecoveryAlogorithm.
- WG 802.1 intensively discussed the reset behavior during development of IEEE Std 802.1CB. For example, see
  - https://www.ieee802.org/1/files/public/docs2015/new-tsn-specht-cb-failure-modes-0521-v1.pdf
  - https://www.ieee802.org/1/files/public/docs2015/new-tsn-specht-cb-reset-challange-0915-v01.pdf
- This slide set:
  - Provides a high-level view of the sequence recovery operation, the VectorRecoveryAlgorithm in particular
  - Shows associated operational cases
  - Summarizes scoping considerations and assumptions

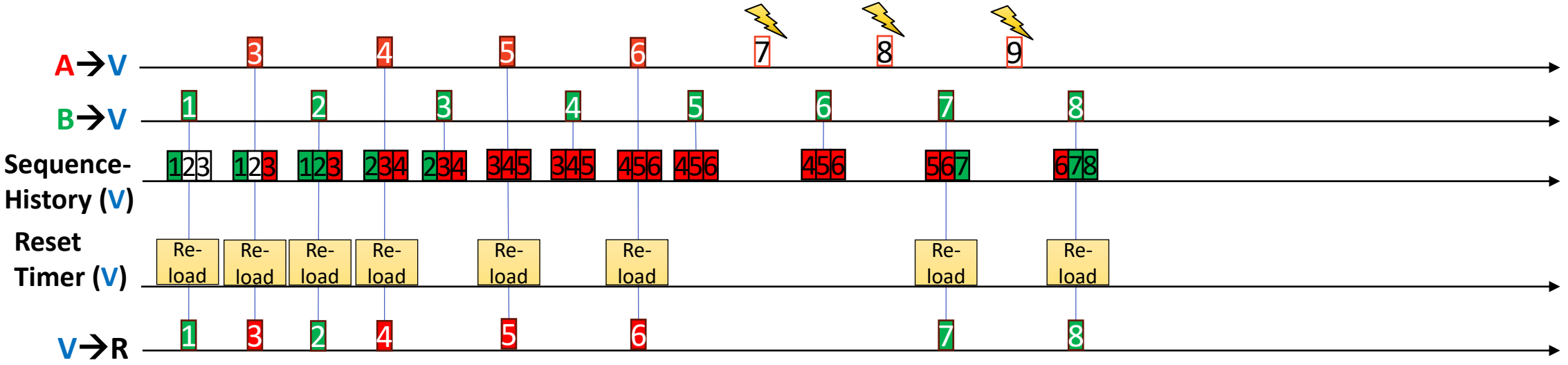
Sequence Recovery Reset Elements

- SequenceHistory [7.4.3.2.2 of 802.1CB]
  - Array of bits, each corresponding the most recently received packet‘s sequence numbers.
  - 1 means marks seen sequence numbers, 0 marks unseen sequence numbers:
    - Only packets with unseen sequence numbers (i.e., first packet replicates) are passed.
    - Packets with already seen sequence numbers (i.e., straggling packet replicas) are discarded.
  - Array dimensioning accounts for the maximum delta between sequence numbers of replicated packets (i.e., path-delay dependent)
- Reset Condition [7.4.3.3 of 802.1CB]
  - RECOVERY_TIMEOUT event [item c) in 7.4.3.1], raised when RemainingTicks [7.4.3.2.4] reaches 0 (i.e., a reset timer).
    - Each time a frame passes the recovery function, RemainingTicks is reloaded with ~frerSeqRcvyResetMSec miliseconds [10.4.1.7].
    - In other words, RECOVERY_TIMEOUT occurs after ~frerSeqRcvyResetMSec integer miliseconds of silence [7.4.3.4].
    - Dimensioning of frerSeqRcvyResetMSec is application dependent, assumed to be much greater than the Dimen sioning of SequenceHistory.
  - BEGIN event [item a) in 7.4.3.1]

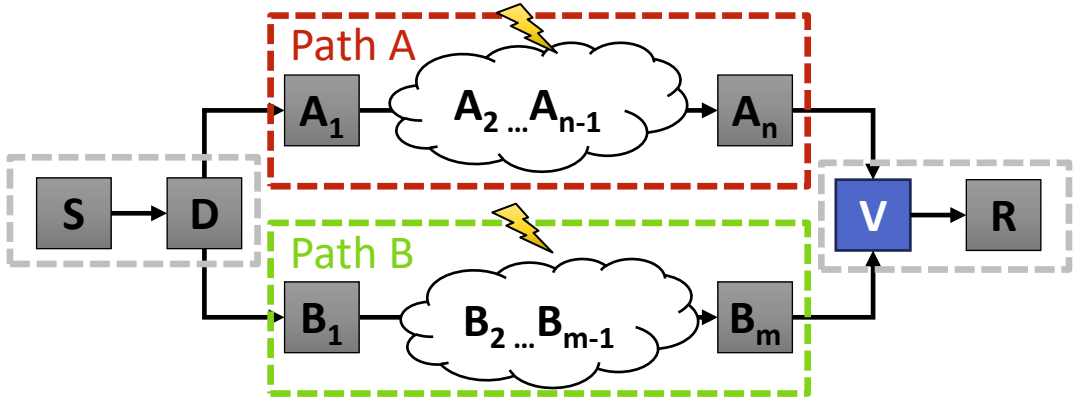
Case: 1oo2 fails (fail-silent)



Legend
S: Sender
D: Duplication
A_i, B_j: Bridge on Path A/B
V: VectorRecoveryAlgorithm
R: Receiver



Case: 2oo2 fail (fail-silent)



Legend
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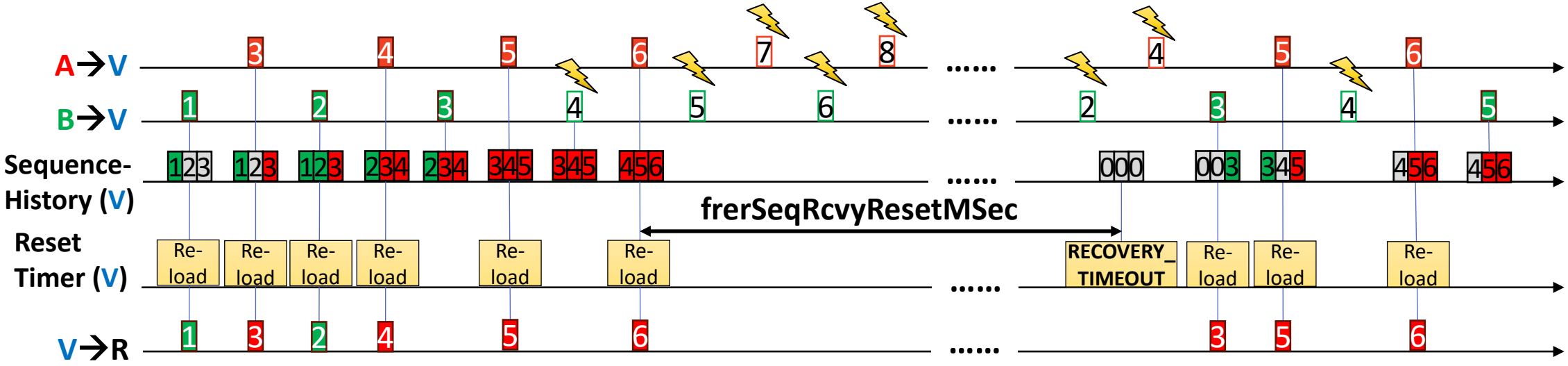
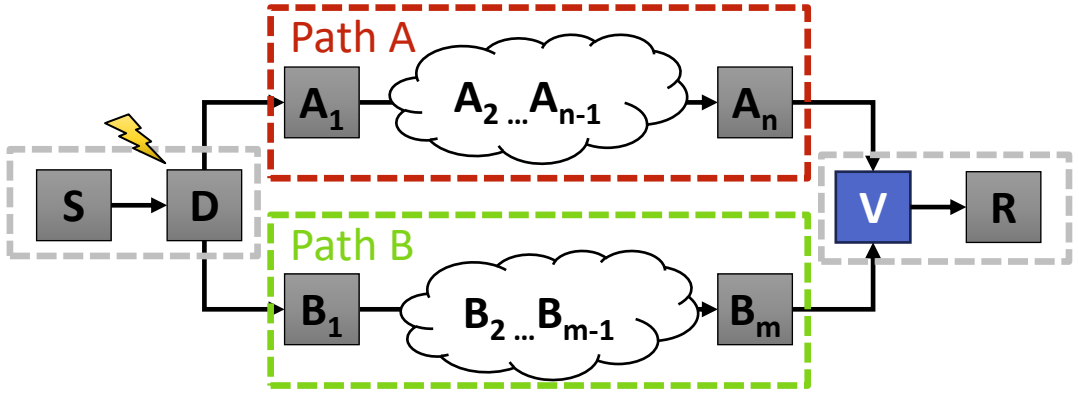
V: VectorRecoveryAlgorithm
R: Receiver



Case: 1oo1 fails (fail-silent)



Legend
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A_i, B_j: Bridge on Path A/B
V: VectorRecoveryAlgorithm
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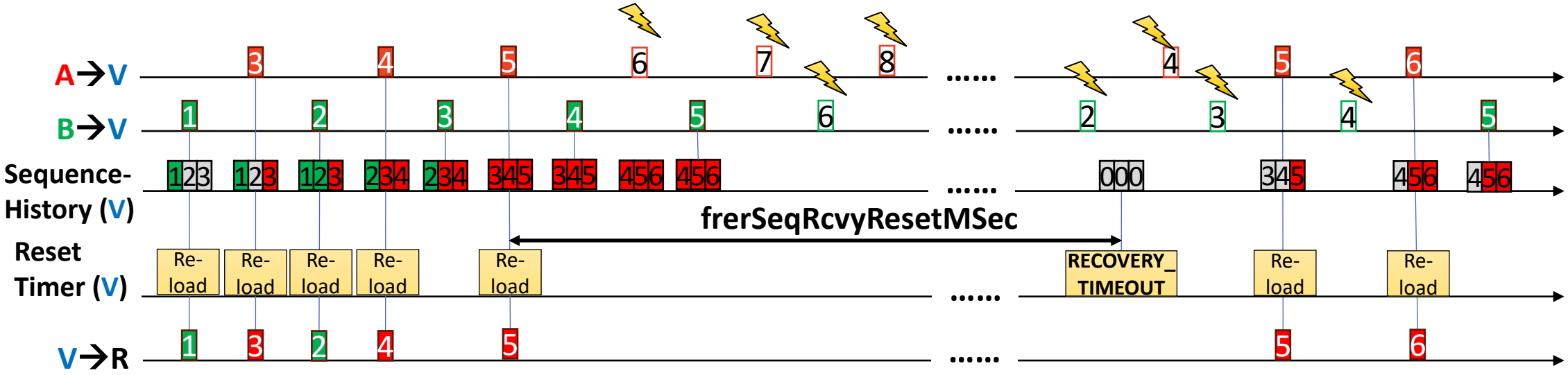
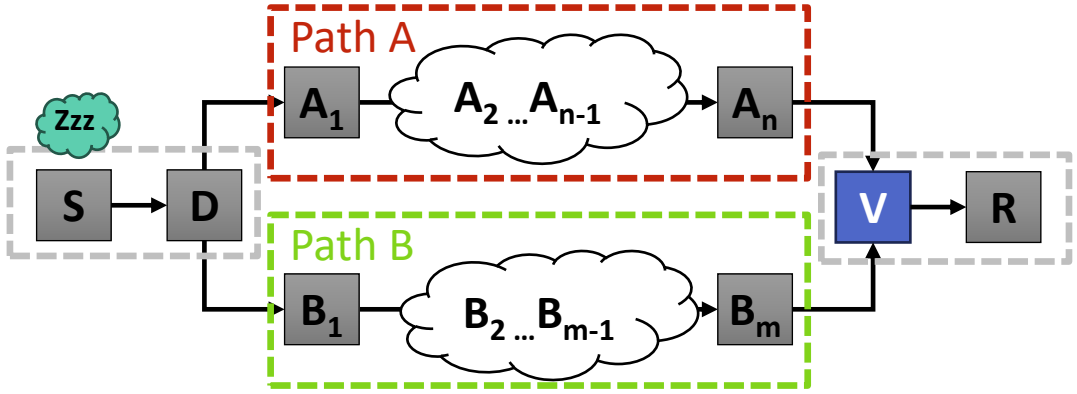


Case: No data to send, no failures



Legend
S: Sender
D: Duplication
A_i, B_j: Bridge on Path A/B
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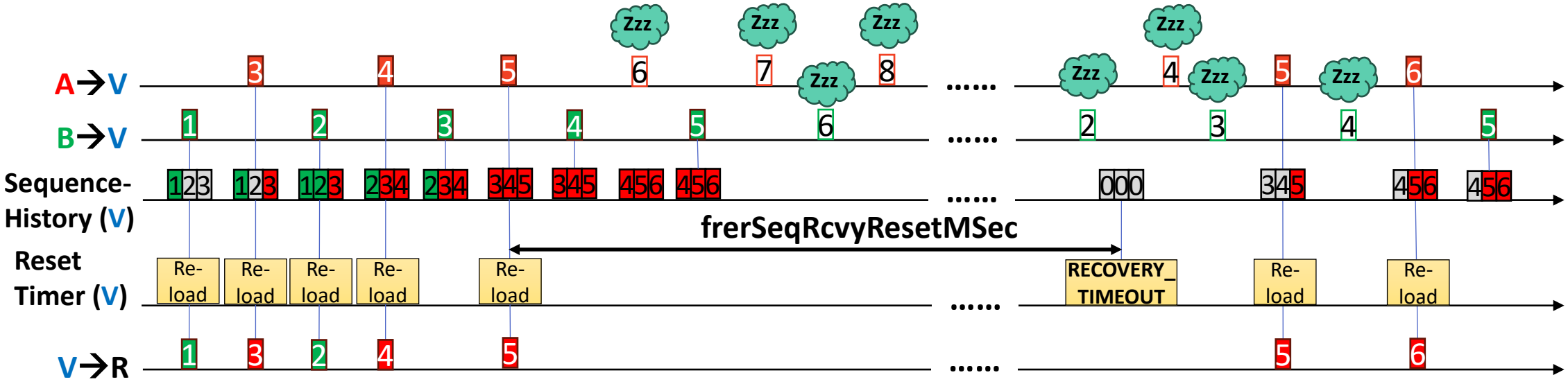

Scope Considerations

Case	Reset-Relationship	Scoping assumptions
1oo2 fails (fail-silent)	No RECOVERY_TIMEOUT event	Unrelated (no RECOVERY_TIMEOUT)
2oo2 fail (fail-silent)	RECOVERY_TIMEOUT event	Out of scope (cannot be fixed by FRER)
1oo1 fails (fail-silent)	RECOVERY_TIMEOUT event	Out of scope (cannot be fixed by FRER)
No data to send, no failures	RECOVERY_TIMEOUT event	In scope

Thank You for Your Attention!

Questions,
Comments?

Johannes Specht
Dipl.-Inform. (FH)
M +49 (0)170 718-4422
johannes.specht.standards@gmail.com