RTCA

Availability and Continuity for Time Critical Services

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Availability: Traditional Definition

❑ Availability = P(System being up) = $\dfrac{\text{Up Time}}{\text{Total Time}}$

❑ Problems:

A. -------- -------- -------- -------- -------- -------- -------- -------

B. --   --------

C. --- --- --- --- --- --- --- --- --- -------------------------------------

❑ All of the above are 90% availability

❑ No distinction for large downtime or small uptime

❑ Revised Definition: Ignore small uptime

❑ Availability2=P(System being up >Ta)

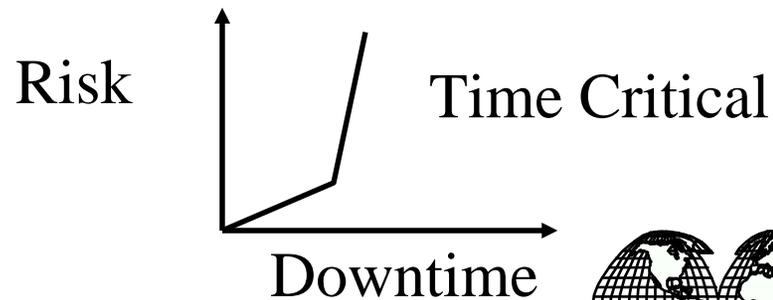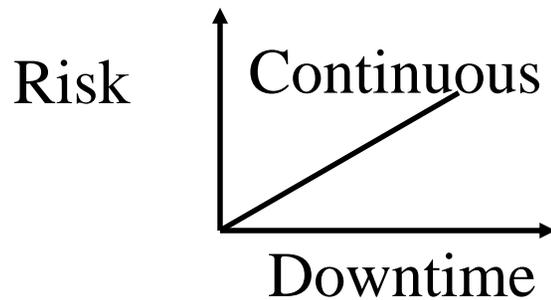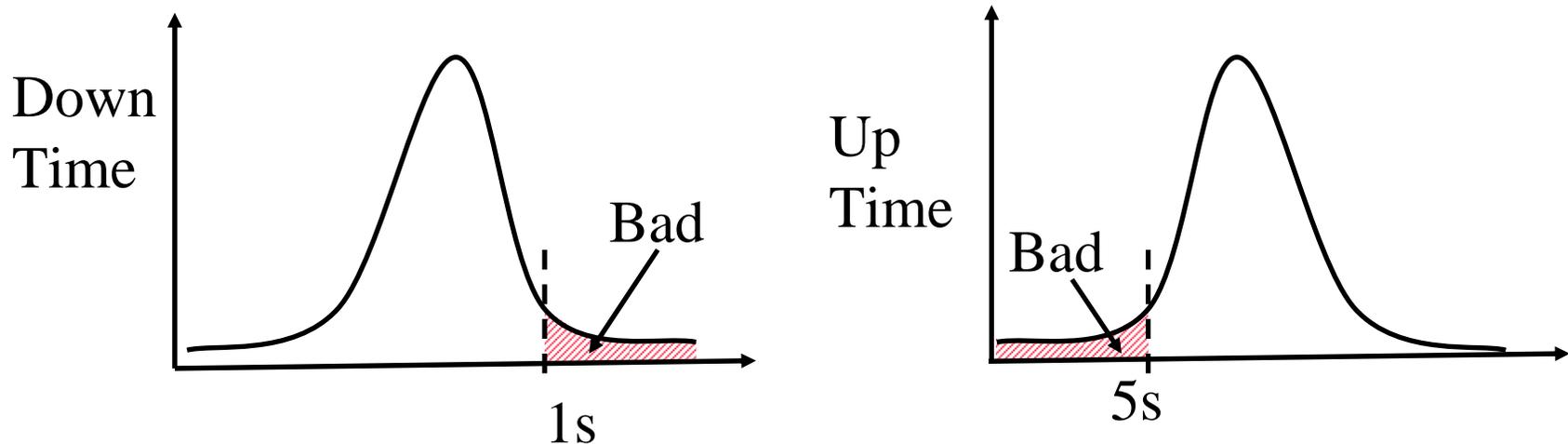$$= \dfrac{\Sigma\,(\text{Uptime}|\text{Uptime}>Ta)}{\text{Total Time}}$$

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- Continuity = P(Transaction completion)

  Transaction Time = Tc

  $$=P(\text{Uptime}>Tc) = \frac{\Sigma\ (\text{Uptime}|\text{Uptime} > Tc)}{\text{Total Time}}$$

- This is the current definition of continuity.

- This is same as Availability2 with Ta replaced by Tc.

- Problems:

  - Ignores large downtimes

  - It is really not the probability of transaction completion

Continuity: Definition 2

- Uptime: ------- - ----   -------

- 3Slot Trans Success: -----   --   -------

- P(Transaction Completion)
  $$= \frac{\Sigma\ ((\text{Uptime}-(Tc-1))|\text{Uptime}>Tc))}{\text{Total Time}}$$

- Problem: Still does not account for large downtimes
  Assumes risk is proportional to total downtime

Risk | Continuous   Risk | Time Critical

        Downtime   Downtime

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Down Time

Bad

1s

Up Time

Bad

5s

❑ 99.9-percentile downtime and 0.1-percentile uptime are more meaningful than any metric based on total uptime or downtime

❑ Alternately:

➢ Probability of downtime > Tc = 0.999
Probability of Uptime <Ta = 0.001

Summary

❑ For time critical services, sums are meaningless (Difficult to assess risk)

❑ Statistics related to individual downtime or uptime are more meaningful

❑ Percentiles of downtime are meaningful in risk assessment.