Graduate Operating Systems

Fall 2017

Paper “Reliability Issues”

• Survey articles
• Reliability & fault tolerance
• Reliability vs. reliance
• Fault -> Error (state) -> Failure (event)
• MTBF (MTTF), MTTR, MTTDL, Availability
• Error detection & error recovery
  • How are parity bits used for detection/recovery?
• Repair of fault; repair of error
Paper “Reliability Issues”

- Faults:
  - HW, communication, timing, user/operator, design, …
  - Duration: permanent, transient
  - Extent: localized, distributed
  - Value: fixed, varying erroneous values
  - User error

Paper “Reliability Issues”

- Fault tolerance vs. fault avoidance
- Replication
  - What are atomic actions?
- Levels of abstractions; interfaces
- Protective redundancy
- Error detection
  - “Sanity check”
  - Replication, TMR
  - Reversal check
  - CRC, parity, Hamming, etc.
  - Interface checking
  - Diagnostic checking
Paper “Reliability Issues”

• Fault treatment
• Fault injection
• Reconfiguration strategies
• “Graceful degradation”
• Error recovery (backward/forward)