IFIP 10.4 Workshop on Dependability & Fault Tolerance
Visegrád, Hungary, June 27-30, 2013

Session 1 — David Powell

- **John Meyer**
  50 years of measuring system quality

- **Mootaz Elnozahy**
  Dependable high performance Exascale computing

- **Mirek Malek**
  Proactive fault management

- **John Meyer** : 50 years of measuring system quality
  - 1960's : reliability, performance
  - 1970's : degradable performance, performability
  - 1980's : dependability, QoS
  - 1990's : QoX, security measures
  - 2000's : user-perceived quality, resilience to change
- Future
  - more refined measures applicable to systems ranging from embedded systems to clouds
  - security measures that can be evaluated in practice thru' models, experiments and field data

- **Mootaz Elnozahy** : Dependable high performance Exascale computing
    - energy, resource and performance constraints; decreased MTBF (with COTS HW)
    - checkpointing hits its limit: capacity loss ~ 20%
    - energy budget worries: upper (economic) limit of ~ 20 MW per facility
    - challenge: reduce capacity loss to 1%, increase MTBF to at least 15 days
  - Future
    - research agenda covering ABFT, compiler-inserted resiliency, machine learning for detection&recovery, runtime resilience support, new HW

- **Mirek Malek** : Proactive fault management (PFM)
  - monitoring, diagnosis, prediction, recovery and preventive maintenance
  - ever-increasing complexity, data, threats
  - need good, short-term prediction
  - use runtime monitoring to identify failure-prone situations
  - prediction techniques: UBF, HSMM, event-sets
  - Future
    - research issues for better PFM and assessment of PFM effectiveness
    - key choices: what to monitor, how to predict, how to exploit for recovery, how to adapt by closing the loop