Newsflash: ARM mbed

- IoT Device Platform
- Mbed OS
  - Free on ARM architecture
  - Designed w/ power efficiency in mind
- RESTful Architecture
  - Client-server separation
  - Stateless
  - Cacheable
  - Layered system
  - Code on demand
  - Uniform interface
- Common OS and Connectivity Across Markets
  - Smart Cities
  - Smart Homes
- Expected release date: End of 2015

A Statistically Rigorous Approach for Improving Simulation Methodology

- Common questions about the paper:
  - ANOVA
    - Before-and-After Comparison
      - Used to determine the confidence interval
      - *t* = Student's *t* distribution
        - A table, assuming the normal distribution, what is the coefficient (*a*) which should be used to guarantee a certain level of confidence
    - ANOVA Example
      - Overall effect compared to individual effect to determine which had the largest impact
  - Minne SPEC
    - University of Michigan
    - Inputs are miniaturized in such a way that the benchmarks still behave in a way similar to if they were given the full, standard input.
    - Reasons for disuse:
      - Sampling
      - Simpoint
  - RAS
    - Return Address Stack
    - Stores the return addresses of function calls
    - Allows return targets to be quickly retrieved
  - Sum of Ranks
    - Why didn't they just take the average?
      - Could have been useful for removing outliers
    - Authors did say that the ranks are arbitrary
    - Usefully for distinguishing between different parameters. Rather than assigning some score to each parameter, one could simply say which is more important than the other.
    - There's some evil in every approach
  - Foldover PB
    - Add X additional rows to PB matrix
      - Signs of additional rows are opposite of original rows
      - Provides some additional insight
- Plackett and Burman Designs
  - https://onlinecourses.science.psu.edu/stat503/node/52
  - Requires significantly less simulation than other methods
  - Parameters are set to reasonable values and not randomly generated
  - Similarity study performed using bottleneck similarity instead of program characteristic study
    - Study is architecture-dependent

- Design of Experiments – Terminology
  - Response Variable
    - Measured output value
      - E.g. total execution time
  - Factors
    - Input variables that can be changed
      - E.g cache size, clock rate
  - Level
    - Specific values of factors (inputs)
      - Continuous (~bytes) or discrete (type of system)
  - # of Experiments = L^F
- Full Factorial Design w/ Replication
  - Measure system response with all possible input combinations
  - Replicate each measurement *n* time to determine effect of measurement error
  - m factors, *v* levels, *n* replications
    - n * v^m experiments
- Fractional Factorial Designs: $n2^m$ experiments
  - Resrict each factor to two possible values
    - High, low
    - On, off