Software or Silicon --
What's the Best Route to Java™?

David S. Hardin
Rockwell
dshardin@cca.rockwell.com

Hypothesis

- Networked, Embedded ‘Java-aware’ applications will benefit from Java silicon.
- Client-side characteristics:
  - Low-consumables
    - Low power
    - Low cost
  - Highly integrated
  - High volume
    - Consumer market
- Examples:
  - Telephony
  - Industrial Controls
  - “Web appliances”
Evidence

- Rockwell has been quietly producing the AAMP family of microprocessors for the past fifteen years.
- Simple, elegant architecture
  - Stack-based, similar to Java Virtual Machine
    - 16-bit word, however
  - Amenable to formal verification
    - Proofs of correctness done under NASA funding (with SRI)
- Wide range of deployed applications
  - Commercial OEM GPS receivers
  - Avionics Displays and Autopilots (747-400, 777, others)
  - Telephony
- Low consumables
  - Tremendous code density
  - Low power, low cost (small die size)

Java Silicon

- Rockwell’s experience with AAMP indicates that low-end Java silicon can be cost-effective to design and deploy
- Direct Execution obviates the need for interpreters, Just-In-Time compilers
  - Significant memory savings for embedded systems
    - In the embedded world, memory is not free!
    - JVM leads to compact code
- Prediction: Relative to other low-end hardware/software solutions for the emerging “Java-aware” networked, embedded application space, Java silicon will be:
  - Simpler
  - Cheaper
  - Faster