Technical Subject:

Dependable System for SoC Design Applying Wide-Area SAN/NAS

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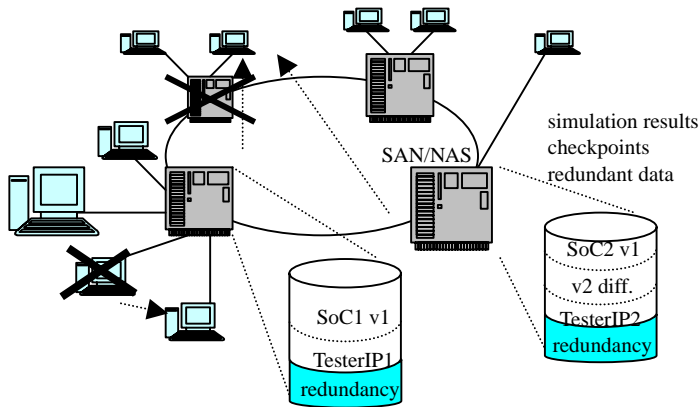Tokyo Metropolitan University, Japan   Sungkyunkwan University, Korea
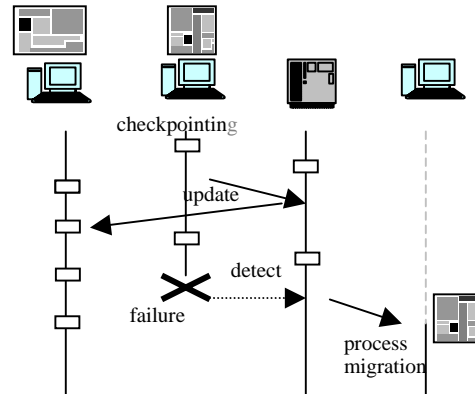

Fig. 1. Dependable system for SoC design   Fig. 2. SoC design using uncoordinated checkpointing

Goal & Contribution to well-being for humanity
Development of dependable distributed system for SoC design
- Dependable environment such as synthesize, DFT, BIST design and all that
  - Dependable computation and storage: availability 24/7
  - Dependable version management: about once a day / site
  - Dependable design data delivery: no retransmission
→ **Apply SAN/NAS for wide-area system, aiming to improve the dependability of data (Fig. 1)**
- User-friendly SoC embedded in daily life

Method / Approach
Uncoordinated checkpointing (Fig. 2)
- SoC-design-oriented checkpointing
  - Frequent changes by designers and customers →Generate checkpoints at the point of changes
    - ... keep checkpoints on SAN/NAS, hybrid with Global Snapshot by coordinated checkpointing
- Dependable MPI ... apply time-delayed TMR

Management of multi-version cores
- SAN/NAS keeps multiple cores of different versions (Fig. 1)
  - Differentials can be used as checkpoints
  - Some parts can be developed by using old generation cores
- Simultaneous simulation on multiple configurations
  - Search for the configuration that satisfies the requirements such as speed, cost, power, etc.

Dependable wide-area communication using convolutional codes
- Improve dependability of communication between SAN/NAS and host
  - Generate redundant packets by convolutional codes ... high recoverability
  - Integrated with retransmission... applied as Hybrid ARQ
  - → effective for bulk data transmission, reduction of retransmission

Secure wide-area distributed SAN/NAS
- Redundant array of multiple SAN/NAS over the Internet → disaster tolerance, terrorism tolerance
- Authorization management for IP (Intellectual Property) usage
- IPSec, Intrusion detection system, packet filtering (stateful inspection)

Position in the session & Call for collaboration
In order to develop a dependable non-stop system, we choose SoC design because it is suitable in the light of its complexity and industrial impact. We hope our technique will make help social systems much more dependable. We have basic skills about network security, but not familiar with up-to-the-minute techniques. We would be much obliged for working with specialists on security.