

Multithreaded Architectures

Supercomputing '93 Tutorial

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Rishiyur S. Nikhil

**Digital Equipment Corporation
Cambridge Research Laboratory**

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**Rishiyur S. Nikhil
Digital Equipment Corporation
Cambridge Research Laboratory
One Kendall Square, Bldg. 700
Cambridge, MA 02139
USA**

**Tel: 1 (617) 621 6639
Fax: 1 (617) 521 6650
Email: nikhil@crl.dec.com**

Preface

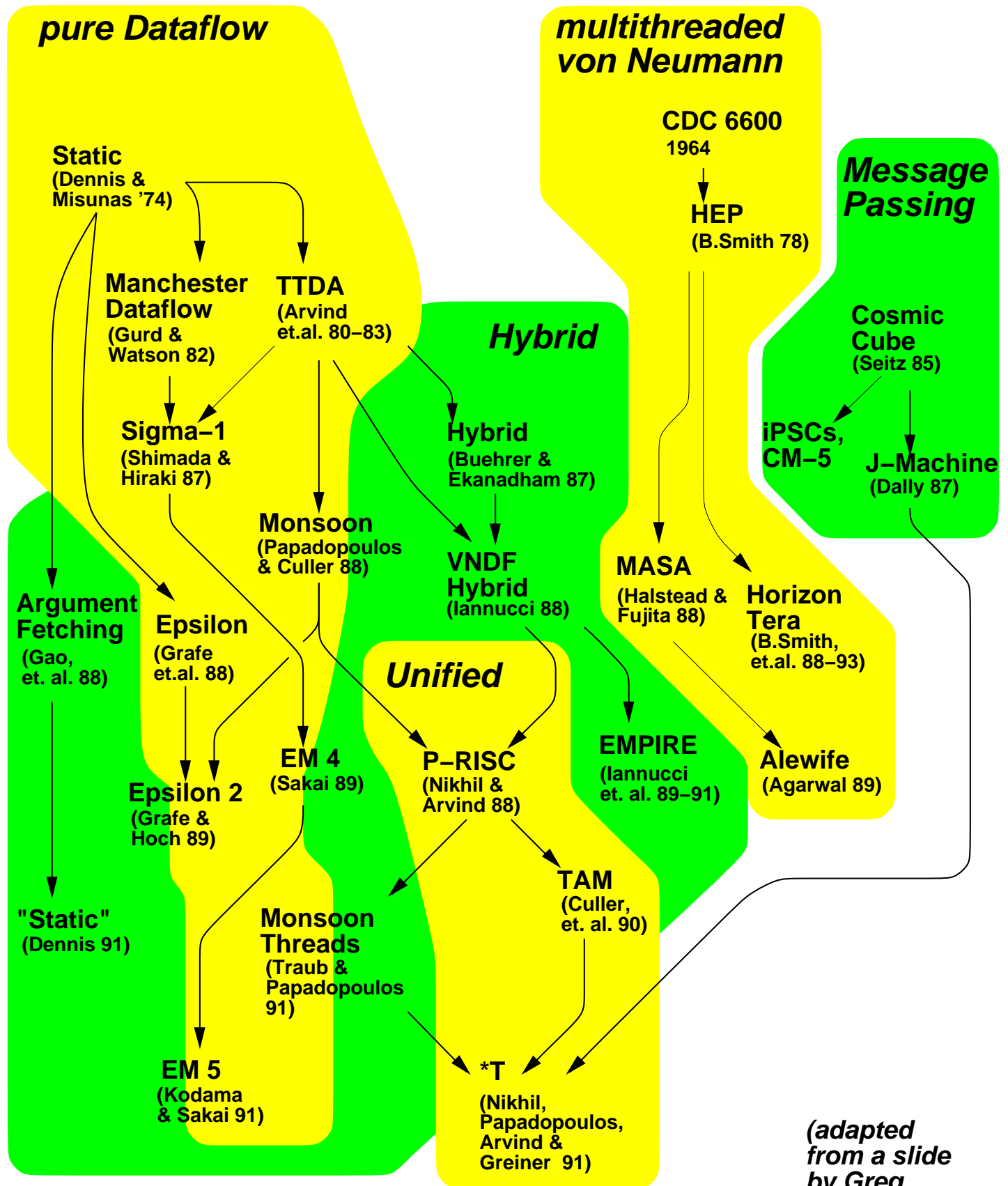
There is an extensive literature on the subject of multithreaded architectures, of which this tutorial can hope to cover only a small slice.

The choice of machines, languages etc. was based on:

- **The author's own experience and expertise;**
- **An attempt to fit them into a coherent story, and**
- **Closeness to “reality” (i.e., actually built, or in the process of being built).**

The bibliography attempts to be more comprehensive.

Unification of Dataflow & von Neumann Designs



(adapted
from a slide
by Greg
Papadopoulos)

Overview of Full Tutorial

Lecture 1: Basics issues, “traditional” solutions

- Latency and synchronization issues
- Framework: Remote & Synchronizing Loads
- Basic ideas behind multithreading
- Distributed cacheing: DASH, KSR-1, Alewife

Lecture 2: A von Neumann story

- HEP and Tera
- Dataflow von/Neumann Hybrid
- J-Machine

Lecture 3: A Dataflow Story

- Pure dataflow: TTDA, Manchester Dataflow, Sigma-1
- Explicit Token Store dataflow: MIT Monsoon, ETL EM-4
- Unification: P-RISC, *T

Lecture 4: The Software Story

- New languages and their implementations
- Extensions to existing languages
- Resource management issues

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