THOTH Project -- BBN Management Presentation*
(12/15/87)

Review of 12/10/87 Monarch Project Meeting at DARPA

Minimum Technical Demonstration of Viability of BBN's Thoth Concept

BBN Wants to Participate in Thoth Phase 3

Resources BBN Has Committed

Resources on Which We Can Draw for Thoth

BBN View of a More Desirable Approach to Demonstrating Viability of the Thoth Concept

Help Which Could Speed Project and Reduce Risk

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* **We will also send a copy of these pages to DARPA.**

Review of 12/10/87 Monarch Project Meeting at DARPA

BBN now views Monarch and Thoth as an end in themselves, distinct from BBN ACI's near-term product plans for Butterfly; the excellence of the Monarch and Thoth designs and the resulting Monarch and Thoth opportunities justify a commitment of BBN resources not distracted by BBN ACI's near-term business pressures (and vice versa)

A copy of the meeting handout is available

DARPA and Ft. Meade agreed to coordinate on BBN's Monarch and Thoth efforts

BBN is to keep both groups informed about progress and problems

There was discussion of methods of decreasing MOSIS turn-around time (the best way to take time out of BBN's proposed Monarch continuation phase 1 schedule)

DARPA asked BBN to answer several additional questions about the past and future of the project in order to have necessary data make a decision about Monarch

Minimum Technical Demonstration of Viability of BBN's Thoth Concept

Get pre-prototype testbed done in time to demonstrate key concepts (signalling, dynamic delay adjustment, level of heat dissapation required, etc.); the proposed Monarch development continuation plan is:

- put the entire current VLSI design team on processor design (without floating point)
- get empirical results when switch chip returns from MOSIS in February
- once processor chip is shipped to MOSIS, put VLSI team on design of memory controller chip

Provide a viable cooling and packaging concept (if the switch chip performs as expected electrically, this becomes a still very big but more straightforward effort)

Continue to improve simulator and to simulate benchmarks in order to demonstrate programmability of Thoth

Work with a semiconductor manufacturer to get correct chip cost estimates

Assemble an appropriate team to provide credibility for building a big system

BBN Wants to Participate in Thoth Phase 3

We have a superb architecture

We have some key expertise and resources and the ability to make contributions in many areas of system design and construction

We haven't got enough expertise and resources to make a system of this size with the current staffing and schedule (at the minimum we need to work with a semiconductor manufacturer)

We propose to very quickly make a plan and build a team which will provide a highly credible approach to building Thoth, i.e., an approach which will ensure our participation in Thoth phase 3

We seek any guidance which Ft. Meade feels it can give on where to find suitable resources and partners which can speed progress and minimize risk, e.g., expertise and effort in cooling and packaging, VLSI design, VLSI fabrication, parallel operating system software, algorithm development and testing, system integration, etc.

Resources BBN Has Committed

VLSI Design (all individuals working primarily on Monarch switch chip)
Basset
Carvey
Dennsion
Sedwick
Tomlinson
Fertsch (just joined)
Fromen (coming soon)
more VLSI design stations (will be ordered ASAP)
more VLSI tools (will be ordered ASAP)

Non-VLSI hardware
The VLSI designers, who are also experienced non-VLSI hardware engineers, have been doing non-VLSI hardware design themselves (and King is also an experienced hardware engineer)
BBN Manufacturing capabilities (presently mechanical and electrical prototyping services)
Gupta (packaging consultant)

Analysis, software, and simulator
Crowther
King
Bromley
Selvidge (part-time)
porting Mach to Monarch (requires retargeting of C)
(Tomlinson is also a very experienced software developer ~~as is Bauman~~)

Project management, administration, and documentation
Barker (BBN Corporate VP for Business Development -- business arrangements with potential partners)
Rettberg (available full-time to assist and consult on Monarch and Thoth -- remainder of time will be directed to documenting and publicizing the Monarch techniques)
Wood (being made available close to full time)
Bauman (coming soon)
free-lance technical writer (to be replaced by BBN Labs employee)

Resources on Which We Can Draw for Thoth

BBN DGI capabilities in special purpose parallel processing design, gate array design, system integration, pilot manufacturing, and development of computer produces

BBN Labs capabilities in hardware engineering and parallel processor applications

BBNCC capabilities in hardware engineering and development of computer products

BBN Labs capabilities in software and operating sytem development

BBN Labs capabilities in project and software development management

BBN DGI capabilities in project and engineering management

BBN Manufacturing

BBN View of a More Desirable Approach to Demonstating Viability of Thoth Concept

Do everything we can to get key Monarch elements done as soon as possible in order to have a more complete demonstration of the Monarch concept and to enter the potential Thoth phase 3 with a relatively complete known-to-work Monarch design

- do the memory chip controller design now (in parallel with the processor chip design)
- do the concentrator chip design now (also in parallel)
- do the processor floating point module design in parallel with the rest of the processor design (perhaps as a test chip which can be merged with the rest of the processor chip at the time we iterate on the processor chip)

Do everything we can to add resources in order to provide a relatively complete design and demonstration of Monarch and to provide a highly credible approach to building Thoth

In general increase the team size and capability

Get faster VLSI turn-around

Help Which Could Speed Project and Reduce Risk

VLSI group which can undertake memory controller chip and concentrator chip in parallel

VLSI group which can undertake floating point processor module in parallel

Faster turn-around at MOSIS or faster alternative to MOSIS

Packaging and cooling help

Advice on most desirable semiconductor manufacturer with which to work

Advice on our ideas for how to get C retargeted to Monarch, e.g.,

- have Green Hills do it -- may require help in convincing them of the potential
- work with a group like MIPS which may already have a C compiler which can be modified (and which might be interested in our suggestions for making the MIPS instruction set more efficient) -- may require help in getting them interested in something they may view as a diversion

Advice on the management additions Ft. Meade believes are necessary for a credible Thoth development plan

Other Ft. Meade suggestions?