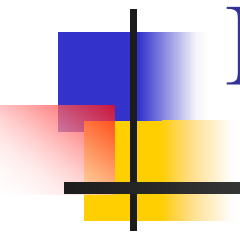

Modeling and simulation of H.26L Encoder

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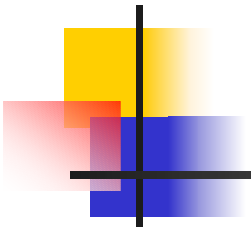
EE382C : Embedded Software Systems

Class Project : Final Presentation

The University of Texas at Austin

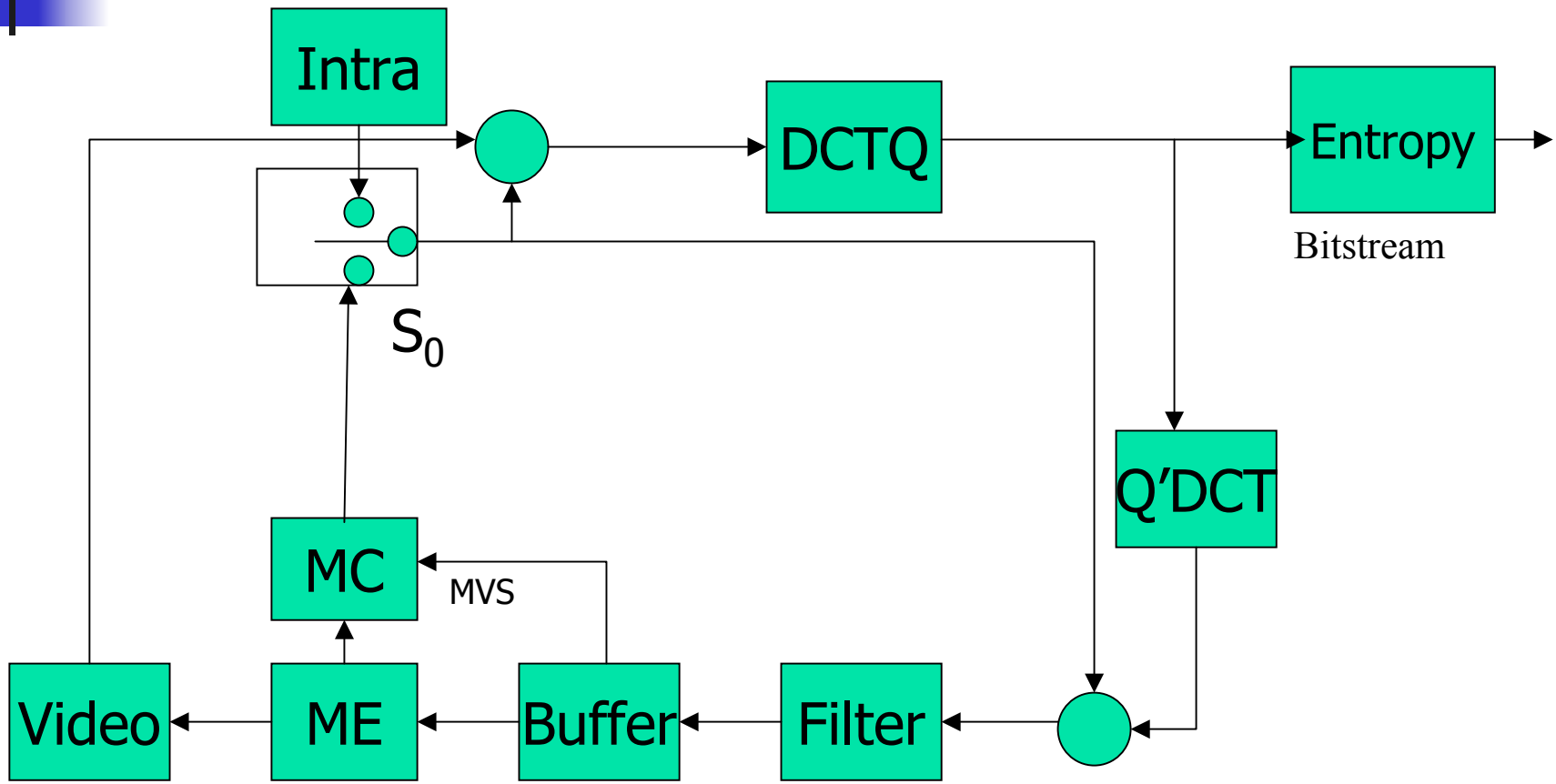
May 1, 2002

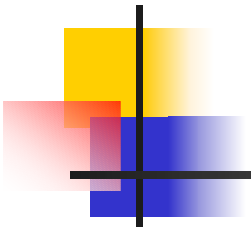


Problem Statement

- Exploit inherent parallelism of existing implementation
- Achieve higher Speed up by distributing the computation in different processors
- Improve scalability and flexibility

H.26L Encoder



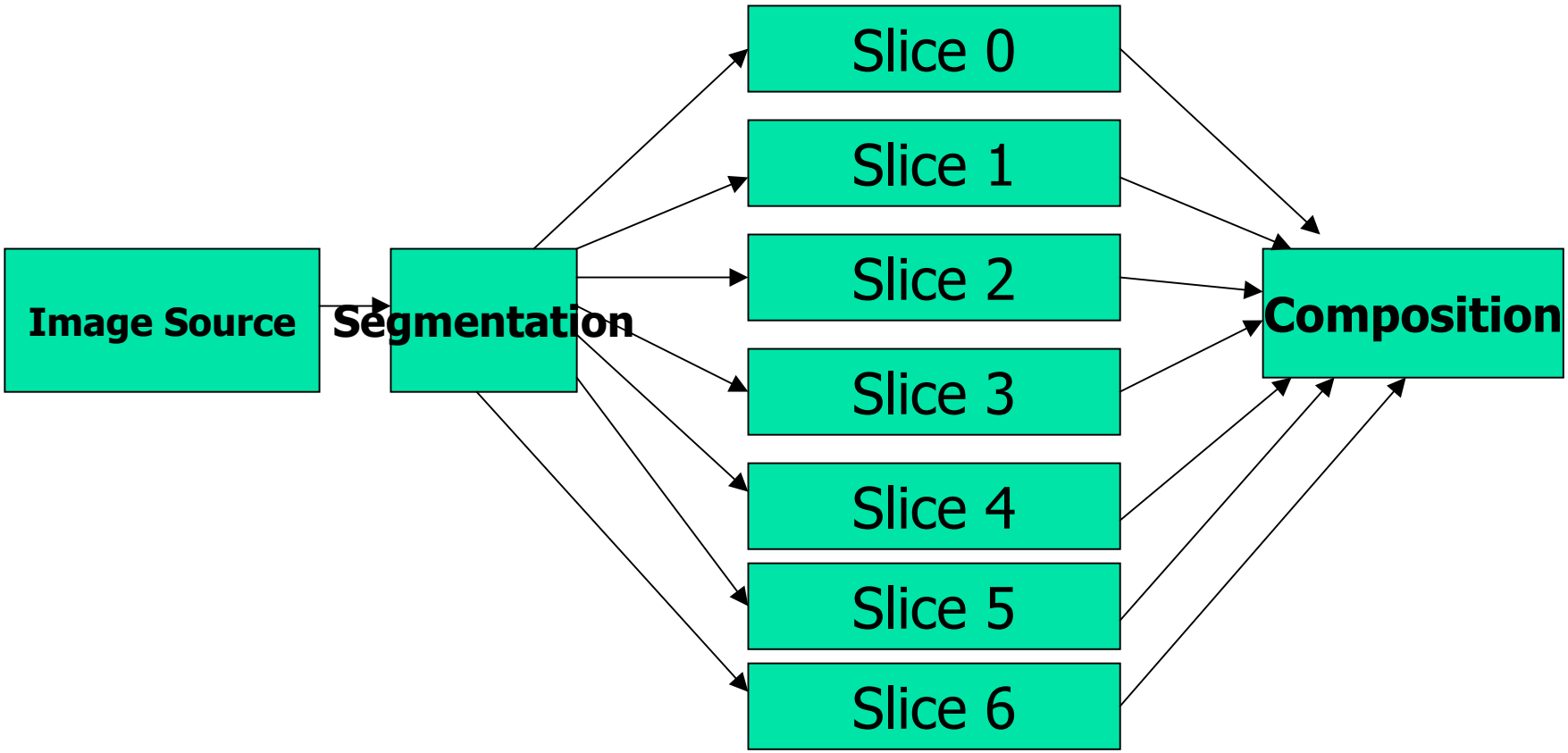


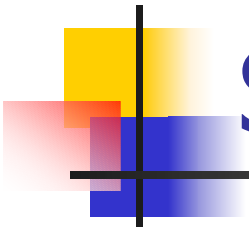
Our Approach

- Identify Computation Intensive blocks
- Exploit image slicing in H.26L
- Modeling in Ptolemy
  - Synchronous Dataflow (SDF) for simulation
  - Code Generation Domain (CGC) for implementation

Our solution

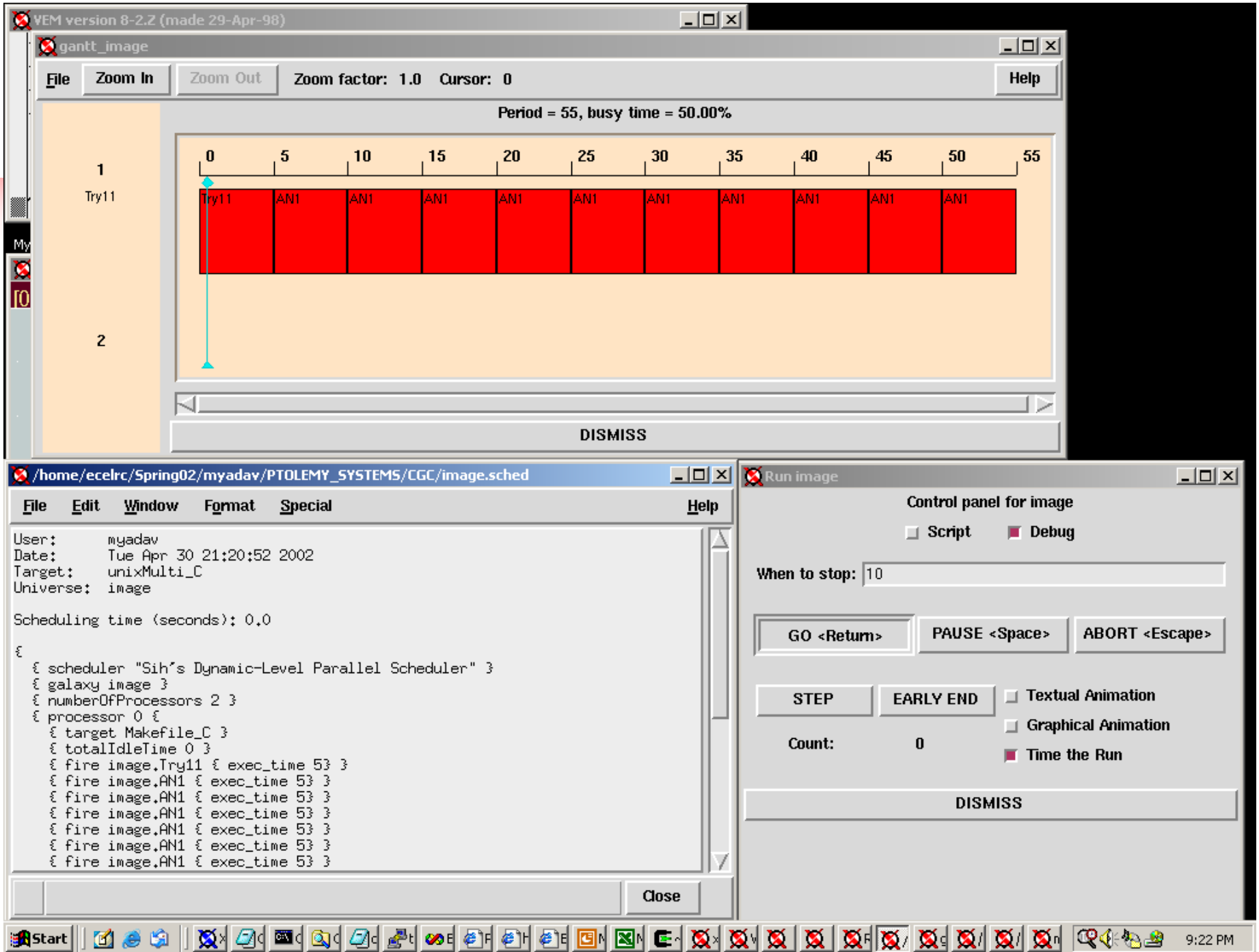
SLICE LEVEL PARALLELISM





Software Implementation

- Transport C code to SDF model in Ptolemy
- Migrate SDF domain to CGC domain
- Test Under Multi Processor Conditions
- Generate Gantt Chart


VEM version 8-2.2 (made 29-Apr-98)
gantt_image
File
Zoom In
Zoom Out
Zoom factor: 1.0
Cursor: 0
Help
Period = 55, busy time = 50.00%
0
5
10
15
20
25
30
35
40
45
50
55
1
Try11
2
Try11
AN1
DISMISS
/home/ecelrc/Spring02/myadav/PTOLEMY_SYSTEMS/CGC/image.sched
File
Edit
Window
Format
Special
Help
User: myadav
Date: Tue Apr 30 21:20:52 2002
Target: unixMulti_C
Universe: image
Scheduling time (seconds): 0.0
{
{ scheduler "Sih's Dynamic-Level Parallel Scheduler" }
{ galaxy image }
{ numberOfProcessors 2 }
{ processor 0 {
{ target Makefile_C }
{ totalIdleTime 0 }
{ fire image.Try11 { exec_time 53 }
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{ fire image.AN1 { exec_time 53 }
Close
Run image
Control panel for image
Script
Debug
When to stop:
10
GO <Return>
PAUSE <Space>
ABORT <Escape>
STEP
EARLY END
Textual Animation
Graphical Animation
Count:
0
Time the Run
DISMISS
Start
9:22 PM

Results

Existing Codec	141.1 sec
SDF Model	133.13 sec
CGC	74.14 sec

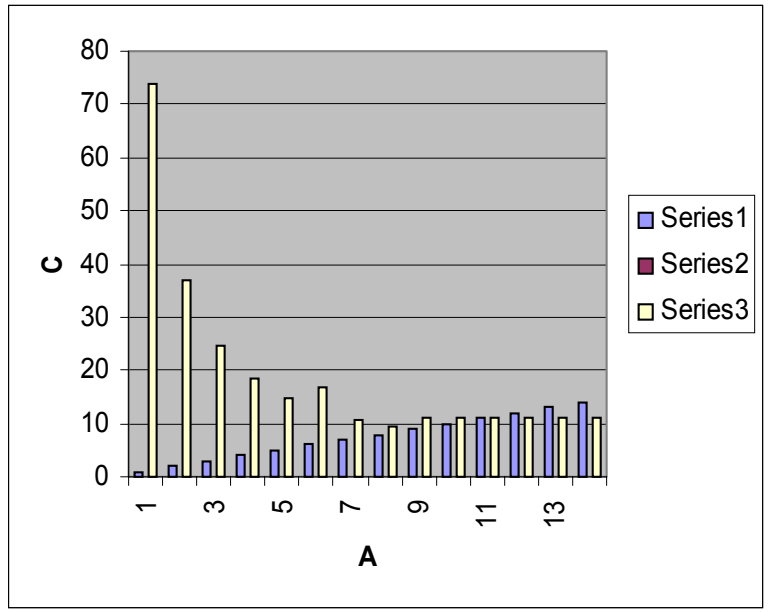
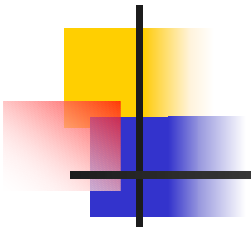


Image Size (176 * 144), 99 Macroblocks (16*16)

Each Slice = 11 blocks TotalNo. Slices = 9

Conclusion



- Our approach

- Linear SpeedUp with the Number of Processors

- InterProcessor Communication is close to zero

- Future Work

- Block Level parallelism in Transform calculations,MV computation and Entropy Coding (UVLC –Universal Variable Length Coding)

- Migration of the above model in other Code Generation domains