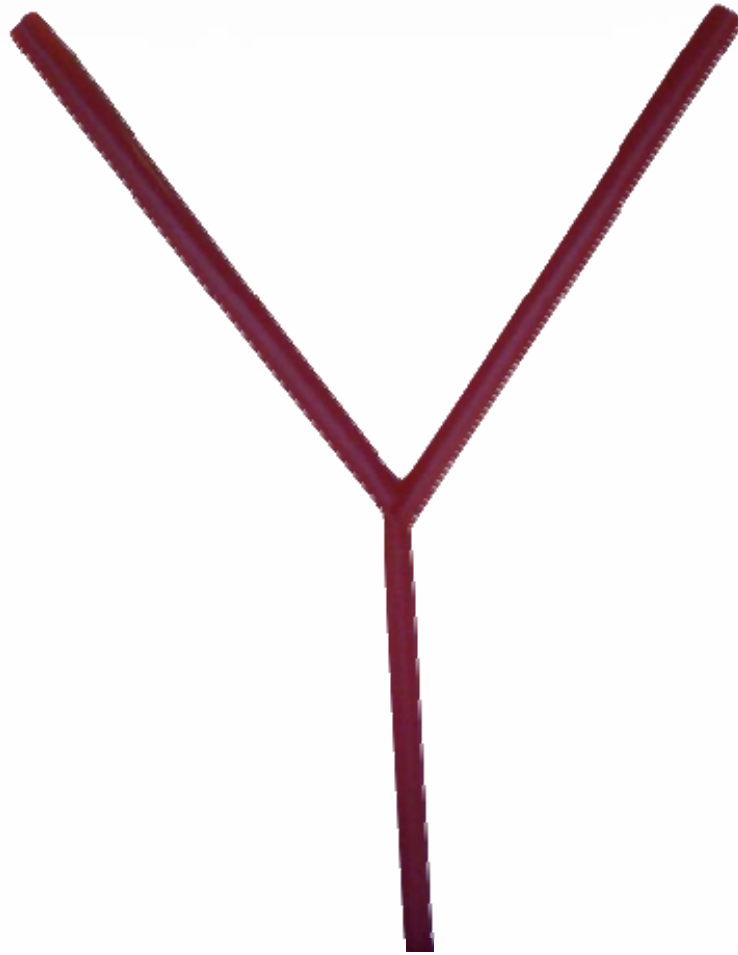


clock rates 1997-2007

1997	300 MHz
1998	450 MHz
1999	733 MHz
2000	1500 MHz
2001	2000 MHz
2002	3000 MHz
2003	3200 MHz
2004	3800 MHz
2005	3800 MHz
2006	3700 MHz
2007	3000 MHz





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```
do i = 1,n
  z(i) = a * x(i) + y(i)
enddo
```

```
loop:
  movsd  (%r8,%rax,8), %xmm1
  mulsd  %xmm0, %xmm1
  addsd  (%r9,%rax,8), %xmm1
  movsd  %xmm1, (%r10,%rax,8)
  addq   $1, %rax
  subq   $1, %rbx
  jg     loop
```

```
loop:
  movapd (%r8,%rax,8), %xmm1
  mulpd  %xmm0, %xmm1
  addpd  (%r9,%rax,8), %xmm1
  movapd %xmm1, (%r10,%rax,8)
  addq   $2, %rax
  subq   $2, %rbx
  jg     loop
```



```
calc1:
  262, Intensity = 2.3
      double 10+ 10* 1/ 8ld 4st
      integer 1+
  274, Intensity = 0.1
      double 4ld 4st
      integer 1+

calc2:
  316, Intensity = 1.5
      double 16+ 8* 16ld 3st
      integer 1+
  330, Intensity = 0.1
      double 3ld 3st
      integer 1+

calc3:
  398, Intensity = 1.1
      double 12+ 3* 9ld 6st
      integer 1+
  410, Intensity = 0.0
      double 6ld 6st
      integer 1+
```



```

DO 100 J=1,N
DO 100 I=1,M
CU(I+1,J) = .5D0*(P(I+1,J)+P(I,J))*U(I+1,J)
CV(I,J+1) = .5D0*(P(I,J+1)+P(I,J))*V(I,J+1)
Z(I+1,J+1) = (FSDX*(V(I+1,J+1)-V(I,J+1))-FSDY*(U(I+1,J+1)
1          -U(I+1,J)))/(P(I,J)+P(I+1,J)+P(I+1,J+1)+P(I,J+1))
H(I,J) = P(I,J)+.25D0*(U(I+1,J)*U(I+1,J)+U(I,J)*U(I,J)
1          +V(I,J+1)*V(I,J+1)+V(I,J)*V(I,J))
100 CONTINUE

```



SPEC CPU2000 171.swim parallel outer loop

	AMD Opteron 2220 SE 2800 MHz 1MB L2\$	Intel Xeon 5160 3000 MHz 4MB L2\$
1 core	122.58s	123.68s
2 cores	112.28s	120.64s



SPEC CPU2000 171.swim Subroutine CALC1

	AMD Opteron 2220 SE 2800 MHz 1MB L2\$	Intel Xeon 5160 3000 MHz 4MB L2\$
1 core	32.02s	30.05s
2 cores	28.08s	30.16s

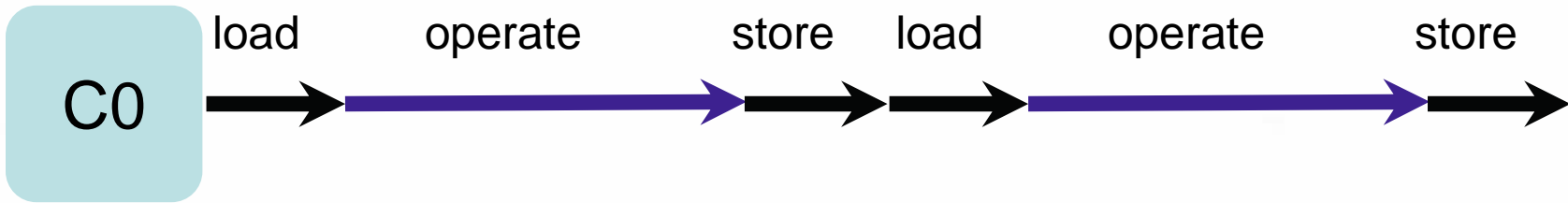


```

DO 100 J=1,N
DO 100 I=1,M
CU(I+1,J) = .5D0*(P(I+1,J)+P(I,J))*U(I+1,J)
CV(I,J+1) = .5D0*(P(I,J+1)+P(I,J))*V(I,J+1)
Z(I+1,J+1) = (FSDX*(V(I+1,J+1)-V(I,J+1))-FSDY*(U(I+1,J+1)
1          -U(I+1,J)))/(P(I,J)+P(I+1,J)+P(I+1,J+1)+P(I,J+1))
H(I,J) = P(I,J)+.25D0*(U(I+1,J)*U(I+1,J)+U(I,J)*U(I,J)
1          +V(I,J+1)*V(I,J+1)+V(I,J)*V(I,J))
100 CONTINUE

```





```

DO J=1,N
DO Ib=1,M,block
  load block of P(Ib:,J), P(Ib:,J+1)
  load block of U(Ib:,J), U(Ib:,J+1)
  load block of V(Ib:,J), V(Ib:,J+1)
  --post--
  DO I=Ib,Ib+block
    lCU(I+1) = .5D0*(lP(I+1)+lP(I))*lU(I+1)
    lCV(I) = .5D0*(mP(I)+lP(I))*mV(I)
    lZ(I+1) = (FSDX*(mV(I+1)-mV(I))-FSDY*(mU(I+1)
1          -lU(I+1)))/(lP(I)+lP(I+1)+mP(I+1)+mP(I))
    lH(I) = lP(I,J)+.25D0*(lU(I+1)*lU(I+1)+lU(I)*lU(I)
1          +mV(I)*mV(I)+mV(I)*mV(I))
  ENDDO
  --wait--
  store block of CU(Ib+1:,J)
  store block of CV(Ib:,J+1)
  store block of Z(Ib+1,J+1)
  store block of H(Ib:,J)
ENDDO
ENDDO

```



SPEC CPU2000 171.swim
Subroutine CALC1
manual data streaming

	AMD Opteron 2220 SE 2800 MHz 1MB L2\$	Intel Xeon 5160 3000 MHz 4MB L2\$
1 core	35.12s <i>(32.02s)</i>	30.67s <i>(30.05s)</i>
2 cores	18.92s <i>(28.08s)</i>	19.55s <i>(20.16s)</i>



SPEC CPU2000 171.swim manual data streaming

	AMD Opteron 2220 SE 2800 MHz 1MB L2\$	Intel Xeon 5160 3000 MHz 4MB L2\$
1 core	126.20s <i>(122.58s)</i>	116.88s <i>(123.68s)</i>
2 cores	87.79s <i>(112.28s)</i>	90.58s <i>(120.64s)</i>





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Booth 728