Research Report

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review of the issues

- Reconsturct loops and array accesses: issues 1) imperfect loop nest 2) complex boundary
- Test NLR on Windows Platform
- Integrate NLR to PoCC (adding one more source code to the Collection)
- Energy Tuning Project
  - Lulesh benchmark using PPCG
  - PNNL benchmark

Progress & Problems

- Reconstruct from the trace
  - NLR also works on imperfect loop nests (by setting parameters of NLR -- Professor Ketterlin's previous study addressed this aspect)
  - Tested Imperfect loop nests for gemm.c, success (see next slide)
  - NLR compiles and runs with Cygwin.

success case: gemm.c with imperfect loop nest

```
#pragma scop
  /* C := alpha*A*B + beta*C */
  for (i = 0; i < _PB_NI; i++)
    for (j = 0; j < _PB_NJ; j++)
      {
    C[i][j] *= beta;
    for (k = 0; k < _PB_NK; ++k)
      C[i][j] += alpha * A[i][k] * B[k][j];
      }
#pragma endscop
```

Above: original scop

>>>Right: constructed from trace
(loop boundary set to 10), the
code is correctly reconstructed.

```
#pragma scop
for ( i0 = 0; i0 <= 9; i0++)
    for ( i1 = 0; i1 <= 9; i1++)
        M[ 162668928 + 80*i0 + 8*i1 ] =
        M[ 162668928 + 80*i0 + 8*i1 ] +
        M[ 3214545984 ] ;
        for ( i2 = 0; i2 <= 9; i2++)
            M[ 162668928 + 80*i0 + 8*i1 ] =
            M[ 162668928 + 80*i0 + 8*i1 ] +
            M[ 3214545992 ] +
            M[ 162669760 + 80*i0 + 8*i2 ] +
            M[ 162670592 + 8*i1 + 80*i2 ] ;
#pragma endscop
```

The plan

- Test NLR with more programs with imperfect loop nests and complex loop boundaries
- Integrate NLR to PoCC (adding one more source code to the Collection)
- Addressing IMPACT 2014 final version issues
- Aim to get a paper (on what topic?) out in a CONFERENCE in 3 months (March 1st, 2014).
- Energy Tuning Project
  - Lulesh benchmark using PPCG
  - PNNL benchmark