ScaLAPACK Survey

The research project "A scalable parallel library for numerical linear algebra" consisted of a number of closely related topics which involves researchers at a number of institutions. ScaLAPACK is being developed at Oak Ridge National Laboratory, the University of Tennessee at Knoxville, and the University of California at Berkeley. ScaLAPACK is a library of software for performing dense linear algebra computations on message-passing computers.

This research led to a number of important new software tools and standards. Recognizing that a message passing standard was necessary to ensure the easy portability of the prototype libraries, the project helped in initiating and promoting the development of the MPI (Message Passing Interface). Standards specific to parallel linear algebra were also developed. The PBLAS (Parallel Basic Linear Algebra Subprograms) are message passing versions of most of the sequential BLAS routines, and have a similar interface. The BLACS (Basic Linear Algebra Communication Subprograms) are a set of routines for communicating rectangular and trapezoidal sub-matrices between processes. The BLACS and PBLAS are important building blocks of the ScaLAPACK library.

The initial public release of ScaLAPACK occurred in 1995 and included routines for the solution of a general system of linear equations via LU and Cholesky factorizations, orthogonal factorizations (QR, RQ, LQ, and QL), reduction to condensed form (upper Hessenberg, tridiagonal form, and bidiagonal), and the symmetric eigenproblem.

Recently we asked the people who requested the material for their reaction. Below is a summary of the responses.

```
*****************************************************************************
From: KWOK Wong-Chuen Tony <mawkwok@uxmail.ust.hk>
To: scalapack-survey@cs.utk.edu
Subject: Re:  ScaLAPACK survey

Yes.

Scientific Computation.
The size of my problem is usually small : less than 5000x5000 (matrix size).

I use Paragon.

I wonder whether there will be any nonsymmetric eigenvalue solver in
scalapack in the future.
Thank you.


*****************************************************************************


From: "Dr. Shiu Hong Lui" <shlui@uxmail.ust.hk>
To: scalapack-survey@cs.utk.edu
Subject: Re:  ScaLAPACK survey
```

Hi. I've been using Scalapack to compute pseudospectra of matrices on
the Paragon. The test matrices are so far relatively small (2000).

The only thing I can think of is better documentation. For instances, you
should let users know that you have some good utility programs. I've
asked for help from your team by email on two occasions and the responses
have been prompt and extremely helpful. Thank you!

Best,
SH Lui

****

From: ogitsu@strider.issp.u-tokyo.ac.jp
Subject: Re: ScaLAPACK survey

> Are you currently using ScaLAPACK?

Yes

>
> What are your applications and sizes of problems?

diagonalization of hermit matrix

>
> What kinds of machines are you using to solve
> linear algebra problems?

DEC 3000/700, Fujitsu VPP500/40, SUN4/10

>
> Any comments and suggestions for improvement are welcome.

This package is very very helpful for me and for my colleagues. I'm very
thankful to the stuffs for the ScaLAPACK project.

--
ogitsu@issp.u-tokyo.ac.jp

****

From: <devemy@quantix.u-strasbg.fr>
To: scalapack-survey@cs.utk.edu

Subject: Scalpack

Sir,

I got Scalapack to test it and to see if it could be
usefull for me. I am not using it at the moment but
I plan to use it very soon. I want to use it to solve
an eigenvalue problem. I want to obtain all the eigenvalues
and eigenvectors of a real symmetrical matrix of order
between 400 and 2000. I am working with PVM on IBM SP2,
CRAY T3D/E and a network of workstation.
As I don't have lots of experience, I can't give you
more feedback or any suggestions, sorry.

Thank you for all the work you do and put at the disposition
of everybody.

Jerome Devemy
Quantum Chemistry Lab.
University Louis Pasteur, Strasbourg, France

****

From: Anne Kv{rn| <anne@imf.unit.no>
To: scalapack-survey@cs.utk.edu

>>>>> ">" == scalapack-survey <scalapack-survey@cs.utk.edu> writes:

>> Dear Colleague,
>> In order to improve ScaLAPACK we are trying to understand how
>> people are using the software. Your feedback is important.
>> Could you take a moment to answer three questions.

>> Are you currently using ScaLAPACK?

Yes.

>> What are your applications and sizes of problems?

I am giving a course in supercomputing, and has demonstated the use
of ScaLAPACK there. The idea has not been to give the students a
thorough introduction to the package, it has rather been to make them
aware of the existence of the software, and to motivate them for using

it for their own application later on.

>> What kinds of machines are you using to solve
>> linear algebra problems?

An Intel Paragon XPS A4, with 56 compute nodes.

>> Any comments and suggestions for improvement are welcome.
>> Please email the information to scalapack-survey@cs.utk.edu.

Well, for my purpose, an introductory text like a "Getting started
with ScaLAPACK" would be welcomed very much.

Sincerely yours

  Anne Kvrn
  Department of Mathematical Sciences
  The Norwegian University of Science and Technology

****

From: hodges@watt.ee.ucla.edu
Subject: Re: ScaLAPACK survey

>
> Dear Colleague,
> In order to improve ScaLAPACK we are trying to understand how
> people are using the software. Your feedback is important.
> Could you take a moment to answer three questions.
>
> Are you currently using ScaLAPACK?

 No, although I've been trying to get our people to install
 it on the IBM SP2 for some time now. They put pessl on
 instead, which turned out to be a bummer since it doesn't
 have complex routines...

> What are your applications and sizes of problems?

 Electromagnetics (antenna radiation problems and such). Problems
 are currently too large for available computers, so we are going
 to parallel processors.

> What kinds of machines are you using to solve
> linear algebra problems?

 Currently we are using large RS/6000 machines (it's what we have available). Se also have an IBM SP2, but software is a problem.

> Any comments and suggestions for improvement are welcome.

The reason that Office of Academic Computing has given for
not supporting ScaLAPACK is that there is no user manual.
They feel that (a) it is still in beta condition, (b) there
is not a manual available. Therefore, it could represent
a support problem.

****
From: Domingo Gimenez Canovas <domingo@pandora.dif.um.es>
To: scalapack-survey@cs.utk.edu
Subject: Re: ScaLAPACK survey

Dear Colleague,
In order to improve ScaLAPACK we are trying to understand how
people are using the software. Your feedback is important.
Could you take a moment to answer three questions.

Are you currently using ScaLAPACK?
No. I am planing to use ScaLAPACK.

What are your applications and sizes of problems?
Eigenvalue problems (dense), design of algorithms
and applications in quantum chemistry and clasification.
From some hundreds to some thousands, it depends on the speed of the algorithms.

What kinds of machines are you using to solve
linear algebra problems?
Workstations with PVM, Sillicon Graphic Power Challenge (with 4 processors),
Alliant FX/80 (with 8 processors), Supernode PARSYS SN-1040 (with 23
transputers), iPSC/860 (with 32 processors), and Intel Paragon
(with 44 processors).

****
From: Nunzio Putrino <nunzio@ifi.unibas.ch>
Date: Mon, 12 Feb 96 09:51:18 +0100
To: scalapack-survey@cs.utk.edu
Subject: Re: ScaLAPACK survey

References: <bulk.775.19960212012205@wilma.cs.utk.edu>

>Are you currently using ScaLAPACK?

Yes.

>What are your applications and sizes of problems?

Scientific computing; over 1.000.000;

>What kinds of machines are you using to solve
linear algebra problems?

Intel Paragon.

Suggestions:

a) It could be helpful for the users to access a README file or =
s.th. like that where all the links to the different libraries are =
listed.
b) Having examples.
c) Introduce a hot-line

****
From: perla@matna2.dma.unina.it (perla)
To: scalapack-survey@cs.utk.edu
Subject: ScaLAPACK survey
Cc: perla@matna2.dma.unina.it

Dear Colleague,
here are my answers.

Are you currently using ScaLAPACK?
Yes

What are your applications and sizes of problems?
My application concerns eigenvalue problems for large, sparse matrices.
The algorithms used are parallel block versions of Lanczos algorithm, and
ScaLAPACK routines are used to solve the linear algebra problems
involved in the algorithms (like QR or LQ factorizations).
I tested sparse matrices at least of order 16000 with sparsity
percentage of 1%.

What kinds of machines are you using to solve
linear algebra problems?

I am using an Intel iPSC/860 and the Paragon. I used also an Convex
Metaseries.

Any comments and suggestions for improvement are welcome.
I noted that the QR (and LQ) factorization seems to be not high
scalable on the previous machines.

Best wishes,
Francesca Perla
Research Center on Parallel Computing and Supercomputers
c/o Complesso Universitario Monte Sant'Angelo
Via Cinthia, Naples (Italy)

****
From: vicere@sun10.difi.unipi.it (Andrea Vicere')
To: scalapack-survey@cs.utk.edu
Subject: Re: ScaLAPACK survey

> Are you currently using ScaLAPACK?

Yes

> What are your applications and sizes of problems?

I am using the matrix factorisation routines for solving impedance-current
linear systems, in the context of the numerical analysis of the electromagnetic
response of extended bodies to electromagnetic disturbances. Matrix sizes
range from 4000 to 10000, (double precision complex).

> What kinds of machines are you using to solve
> linear algebra problems?

Cray T3D systems

> Any comments and suggestions for improvement are welcome.

The ScaLAPACK approach is very convenient. I am unable to suggest major
improvements!

Sincerely,

Andrea Vicere'

****
From: Jerzy Wasniewski <unijw@unidhp1.uni-c.dk>
To: scalapack-survey@cs.utk.edu

>
 Are you currently using ScaLAPACK? Yes
>
 What are your applications and sizes of problems?
Numerical Analysis, Sparse Matrices
>
 What kinds of machines are you using to solve
 linear algebra problems? IBM-Sp2, SGI
>

****
From: HoJoon Jung <hojoon@mantle.snu.ac.kr>
Message-Id: <199602121132.UAA08377@mantle.snu.ac.kr>
To: scalapack-survey@cs.utk.edu
Subject: Re: ScaLAPACK survey

Hello!
I am not using ScaLAPACK yet. I am tring compile it now.

I will do 3-D electromagnetic modeling using finite element
method. It is part of development of 3-D interpretation of
geophysical data. Inverse interpretaion contains linear
algebra , also. This is my application what i will develope.

I can't guess the size of problem exactly, yet. But I think
it is very big maybe.

I will use IBM SP2 parallel machine. Message passing interface
I will use is PVM.

****
From: unibsa@danpost.uni-c.dk (Bjarne Stig Andersen)

>
> Dear Colleague,
> In order to improve ScaLAPACK we are trying to understand how
> people are using the software. Your feedback is important.
> Could you take a moment to answer three questions.

```
>
> Are you currently using ScaLAPACK?

    Yes
>
> What are your applications and sizes of problems?

    The ScaLAPACK Cholesky and LU solvers, are used to solve the
    interface problem in a distributed Finite Element application.

>
> What kinds of machines are you using to solve
> linear algebra problems?

    IBM SP2
>
> Any comments and suggestions for improvement are welcome.
> Please email the information to scalapack-survey@cs.utk.edu.
>
> Your help is much appreciated.
>
> Best wishes,
> The ScaLAPACK Project Team
>
> p.s.  This message is being sent to people who have obtained ScaLAPACK
> over the net.  You have not been added to any mailing list.
>
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```
--
Bjarne Stig Andersen      switchboard: +45 35 87 88 89
UNI-C                     direct line: +45 35 87 89 62
DTU, Building 304         facsimile  : +45 35 87 89 90
DK-2800 Lyngby            e-mail     : bjarne.stig.andersen@uni-c.dk
Denmark
```


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*****************************************************************************
From: <thomas@semt1.smts.cea.fr>
To: scalapack-survey@cs.utk.edu
Subject: Scalapack  survey

Dear colleague,
I am currently using Scalapack and finding it great !!
I use it to solve large (1 GB) electromagnetic problems on an   IBM SP2.
It woould be  nice to have a  skyline solver in  Scalapack to be used
in CFD and stuctural analysis.
```

Keep on this great effort.
Thanks.

****
From: Gang Cheng <gcheng@npac.syr.edu>

>Are you currently using ScaLAPACK?
Not now. I used it about 2 years ago. It is a nice package.

>What are your applications and sizes of problems?
Computational Electromagnetics. 1k by 1k matrix solver.

>What kinds of machines are you using to solve
>linear algebra problems?
Intel Paragon, SP2, NOW.

--- Gang

****
From: <SUBRAMAN@ACC.FAU.EDU>

>Are you currently using ScaLAPACK?
No, But I am planning to use in few days.

>What are your applications and sizes of problems?
Our applications are on rotorcraft aeroelasticity, in
particular on stability analysis of rotorcraft systems
using Floquet theory. In our applications, we expect
to use ScaLAPACK routines for matrix inversion, and for
finding eigenvalues and eigenvectors. Typical
size of problems range from 500 to 1000, that is
martices of that order.

>What kinds of machines are you using to solve
>linear algebra problems?
Currently, we are using MasPar MP-1 and we use
LAPACK routines with the knowledge that only limited
advantages can be obtained. We plan to use
IBM SP2 machine in the near future.

With best wishes
S. Subramanian

Department of Mechanical Engineering
Florida Atlantic University
Boca Raton, FL 33431.

****
From: "Eric R. Bittner" <bittner@cm.utexas.edu>

On Mon, 12 Feb 1996 scalapack-survey@cs.utk.edu wrote:

> Dear Colleague,
> In order to improve ScaLAPACK we are trying to understand how
> people are using the software. Your feedback is important.
> Could you take a moment to answer three questions.
>
> Are you currently using ScaLAPACK?

Not on my current project. We are currently using
ISML and Eispack routines. Future development with our present
code will be to substitute LAPACK and ScaLapack routines
where ever possible.

>
> What are your applications and sizes of problems?

Quantum dynamics of excited solutes in molecular solvents.
16^3 grid for quantum dynamics and 200 flexable classicl
H2O molecules. Numerical procedures include: Lanzcos diagonalization and
FFT for the quantum propagation and spectroscopic analysis.
Verlet molecular dynamics for the classical dynamics.

>
> What kinds of machines are you using to solve
> linear algebra problems?

C90 (at San Diego Supercomputing Centre)

- ERB

Dr. Eric R. Bittner   phone: (512)-471-1092
Dept. of Chemistry and Biochemistry   fax: (512)-471-1624

Univ. of Texas at Austin email: bittner@eiger.cm.utexas.edu
http://eiger.cm.utexas.edu

****
From: Michel Gueguen <Michel.Gueguen@dassault-elec.fr>

Dear Scalapack Project Team,
Here are some answers to your survey.

Currently, I am not using Scalapack but this may happen soon.

I downloaded Scalapack as a part of an evalution project on parallel processing programs and tools. Your approch based on Blas, Blacs, Lapack, Scalapack and some other tools like petsc seems very attractive to me.

However we planned to use MPI (a "real" standard) instead of PVM (a nice "de facto" standard) but the blacs weren't available on MPI (this is quite recent) so I posponed any evaluation of Scalapack.

We are using a network of heterogeneous workstations (IBM, SUN, HP, ..) but we prefer MPI for portability and compatibility reasons.
Since blacs are now available over MPI, we should begin our testing of scalapack.

The target applications are in the electromagnetic domain with a size of several Gigabytes in storage.

If scalapack reveals itself the same quality than lapack, I don't doubt it will be adopted by our scientific users.

Best regards and congratulations for your high grade developpements.

Michel GUEGUEN.

****
From: omnes@onera.fr (Thierry OMNES)

>Are you currently using ScaLAPACK?<
YES.

>What are your applications and sizes of problems?<
Vibro-acoustic BEM-3D problems.
Size 5,000 to 30,000 equations.

>What kinds of machines are you using to solve
linear algebra problems?<
mostly ONERA Intel PARAGON but also CONVEX SPP, CRAY YMP or C90 ...

****
From: "Robert J. Block" <rblock@ncsa.uiuc.edu>
Subject: Re: ScaLAPACK survey

> Are you currently using ScaLAPACK?

Yes

> What are your applications and sizes of problems?

Parallel matlab, all sizes (up to 4000x4000 matrices).

> What kinds of machines are you using to solve linear algebra problems?

SGI Challenge, NOW, maybe Convex Exemplar

> Any comments and suggestions for improvement are welcome.

Well, I do have a comment/question. I've had problems getting the MPI version of the BLACS working on the Power Challenge. I saw the errata note that mentioned interlanguage compatibility problems with MPI, but haven't figured out what to do about it (if that is in fact my problem). I'm using the C interface to the blacs (my code is in C), and the MPI Blacs are compiled with USE_F77. The main reason I compiled the blacs this way is that when I didn't, I got some link errors (unresolved externals) that I couldn't get rid of. I think one of them was a complaint about BI_F77_CONSTANTS.

The bottom line is, the context grids are not being set up right (any call to access them simply hangs). The same application code runs fine using the PVM BLACS version. An brief outline of my code is below, showing where it hangs when MPI BLACS is used. I run this on the Challenge using mpirun -np 4 a.out.

****
From: "Zhang Lin-bo" <zlb@indigo12.cc.ac.cn>

I'm not using ScaLAPACK, but certainly will. I'm one of the system administrators of the computer system of State Key Laboratory of

Scientific and Engineering Computing, and I make available a copy of
NetLib for users of our system. Currently, we have 17 workstations and
an SGI Power Challenge L connected to a 100Mb ATM switch, and a group
of people is working on the development of parallel algorithms for
distributed computing, mainly based on PVM and MPI. I think that it's
a very good idea to make available packages like ScaLAPACK, which can
help people who are not familiar with distributed systems to solve their
problems efficiently.

With best reguards,

Linbo Zhang, Ph.D.,

****
From: okamoto@rd.tepco.co.jp (Hiroshi Okamoto)

>Dear Colleague,
>In order to improve ScaLAPACK we are trying to understand how
>people are using the software. Your feedback is important.
>Could you take a moment to answer three questions.
>
>Are you currently using ScaLAPACK?

Yes.

>What are your applications and sizes of problems?

Matrix size : 2,000x2,000

>What kinds of machines are you using to solve
>linear algebra problems?

Workstation (IBM RS6K) cluster with Fibre Channel Switch.

>Any comments and suggestions for improvement are welcome.

We desire nonsymmetric eigenproblem solver.

Hiroshi Okamoto, Ph.D.
Power System Dept., Power Engineering R&D Center
Tokyo Electric Power Co. (TEPCO)
4-1 Egasaki-cho, Tsurumi-ku, Yokohama 230, JAPAN
E-mail: okamoto@rd.tepco.co.jp
Tel: +81-45-585-8497, FAX: +81-45-585-8502

****
From: slap@meri.fesb.hr (Ivan Slapnicar)

>
> Dear Colleague,
> In order to improve ScaLAPACK we are trying to understand how
> people are using the software. Your feedback is important.
> Could you take a moment to answer three questions.
>
> Are you currently using ScaLAPACK?

No, but I was using it during the first half of 1995, and intend to
use it again soon.

>
> What are your applications and sizes of problems?

My parallel application is developing writing the one-sided
block-Jacobi algorithm for eigenvalues and SVD (joint work with
Peter Arbenz at the ETH Zurich).

I used ScaLAPACK to compute the QR and
Cholesky factorizations of a dense matrix of size up to n=3000.
At the beginning of 1995 I would gladly have compared my timings
with ScaLAPACK but it had no eigenvalue solver implemented at
that time. Now there is, and I intend to try it.

>
> What kinds of machines are you using to solve
> linear algebra problems?

Intel Paragon at the ETH-Zurich with O(100) nodes.
My intention is to try out SP2 and Cray TD3, as well.

>
> Any comments and suggestions for improvement are welcome.

With appropriate matrix and block sizes, ScaLAPACK obtains
excellent performance.

Sometimes it is hard to explain the obtained timings, that is, the
message passing times are difficult to comprehend. This remark goes
more to the vendors than to to ScaLAPACK team.
However, it would be much easier to understand how a particular

machine works if the ScaLAPACK would include examples of timings of
certain routines on particular machines together with a detailed
explanation, whether theoretical or as a rule of the thumb, and
to point out the issues which are not clear.

Also, the storing templates are rather complicated, and it takes
some time to understand them. It is very difficult to modify
programs, since the smallest examples necessarily have a size of
say n=16 (e.g. take four processors, and have blocks larger than 2
or 3), so the output of certain processors is very difficult to
follow. It would be nice to develop some kind of colorful
graphical driver where the user could check how particular program
works, how and where the matrix is stored at some stage of the
algorithm, etc.

Please, have in mind that my comments are not based on newest
ScaLAPACK release.

Best regards,

Ivan Slapnicar

****

From: fk2j@bfkvax.fm.bs.dlr.de (Lothar Thiel, Institut f. Flugmechanik, Braunschweig)

Even though I'm not using ScaLAPACK right now, I will answer your questions.

I work at the
Institute of Flight Mechanics,
Dept. of Mathematical Methods and Data Handling
German Aerospace Research Establishment

We are using LAPACK routines for aircraft simulation, system identification and
control. Usually we only need a SVD for a small system (<100x100) or the
solution to a system of complex linear equations for simulation/identification
of rotorcraft in the frequency domain.

The biggest problem I used the SVD routines for was an example of system
identification: In an iterative loop a simulation is performed. At each
timestep (~5000) a vector of ~20 signals is to be compared to measurements to
solve a system of ~100 unknown parameter improvements. Usually we employ normal
equations to solve this, but I modified a householder triangularization to solve

these 100000x100 systems in 200x100 memory. Since then colleagues have boosted the number of timesteps up to 100000, signals to 100 and parameters to 500 (using normal equations).

Most of our engineers program in FORTRAN.

We are running a cluster of OpenVMS workstations (VAX 4000 and Alpha), but more and more people are using their Intel PCs running Linux or using a 32bit compiler under DOS/MS-Windows. We also have a few SUNs at our institute. The central computing facilities of DLR have IBM RS6000, SGI Power Challenge, NEC and Cray compute servers. It is very important for us to have the sources of software packages, so we can compile and use it on all these platforms.
DEC ships OpenVMS Alpha with LAPACK, but other vendors don't. So when an engineer wants to develop a program on his PC and run it on an Alpha Workstation or even PowerChallenge server we advise him to use LAPACK.

Lothar Thiel

****
From: peter@basil.usfca.edu (Peter Pacheco)

> From: scalapack-survey@cs.utk.edu
> Reply-To: scalapack-survey@cs.utk.edu
> To: survey-recipients:;@cs.utk.edu
> Subject: ScaLAPACK survey

> Are you currently using ScaLAPACK?

Yes

> What are your applications and sizes of problems?

I'm working on a text on parallel programming, and I'm using it as an example of a library that uses MPI. The examples solve random dense linear systems. Up to this point, I've looked at orders up to about 5000.

> What kinds of machines are you using to solve
> linear algebra problems?

Network of SGI's, nCUBE 2. I plan to use it on an SP in the near future.

> Any comments and suggestions for improvement are welcome.
> Please email the information to scalapack-survey@cs.utk.edu.

I look forward to the publication of a users guide and the development of a C interface. I found that the best documentation currently is contained in the library source code.
Generally very easy to install.

Thanks and regards,
Peter Pacheco
Department of Mathematics
University of San Francisco
San Francisco, CA 94117
(415) 666-6630
peter@usfca.edu

****

From: drich@coder.space.honeywell.com (Dan Rich)

```
> Dear Colleague,
> In order to improve ScaLAPACK we are trying to understand how
> people are using the software. Your feedback is important.
> Could you take a moment to answer three questions.
>
> Are you currently using ScaLAPACK?

      Yes, we have used the canned test programs to establish benchmark
      performance and perform trades. We are trying to use ScaLAPACK to
      solve QR problems in which parallelism is needed to meet real-time
      latency requirements for embedded computing.

>
> What are your applications and sizes of problems?

      Space Time Adaptive Processing (STAP) is the primary focus of our
      activity.

      Routines:   PCGEQRF, PCGETRF, PCUNGQR, PCUNMQR, PCPOTRF, PCTPTRI,
                  PCTRTRS, & PCGELS

      Sizes:   32 x 320, 12 x 280, 64 x 1500, 48 x 625, 12 x 250, 16 x 270,
               16 x (max 256) [RTMCARM]

>
> What kinds of machines are you using to solve
> linear algebra problems?

     Intel Paragon/Honeywell Touchstone systems (Paragon GP & MP, Rugged
     Touchstone)
```

****
From: sjohn@mahi.UCSD.EDU (Stuart Johnson)
Message-Id: <9602190317.AA29953@mahi.UCSD.EDU>
To: scalapack-survey@cs.utk.edu
Subject: Re: ScaLAPACK survey

>> Are you currently using ScaLAPACK?

Yes. To be precise, I am using scalapack 1.0 beta, since
I have not had time to upgrade to scalapack 1.x

>> What are your applications and sizes of problems?

We have been using scalapack to do constrained
least squares inversions of 60,000 x 10,000 matrices, with
iterative steps to search for the appropriate lagrange
multiplier (i.e., solve for m, lambda in:

(A(transpose) * A + lambda * D(transpose) * D)m = A(transpose)*d

where A is ~10,000 x 60,000 , D is 10,000 x 10,000
, and lambda is a lagrange multiplier). I use a QR method, which
iteratively solves a factored form of the above equation.

>> What kinds of machines are you using to solve linear algebra problems?

Paragon, 416 node at san diego supercomputer center.

>> comments and suggestions:

I had to do some hacking to preserve (lower triangular) workspace for
the iterative QR method. The code was very transparent and the fixes
pretty much just worked. I spent quite a lot of time working on
scalable SBS I/O, since the matrices were quite difficult to build
and I didn't want to bother debugging all of the matrix construction
code (all the physics) on the paragon. This finally worked pretty well,
but it would be nice to have an official matrix I/O code (maybe there
is one by now).

Anyway, nice software. Now it's on to sparse problems...

Stuart Johnson
Institute of Geophysics and Planetary Physics
Scripps Institution of Oceanography

****
From: Micha/l Mrozowski <mim@pg.gda.pl>

> Are you currently using ScaLAPACK?
>

Yes

> What are your applications and sizes of problems?
>

Solution of eigenvalue problems arising in electromagnetic field theory.
Both dense and sparse complex matrices sizes 1000-2000 unknowns (dense)
and 20000 unkonows sparse. Generalized and standard problems.

> What kinds of machines are you using to solve
> linear algebra problems?

SGI Power Challenge - 4 processors -

>
> Any comments and suggestions for improvement are welcome.

1) There is a need to implement "purging" algorithm since for some values of
NCV the procedure keeps computing the eigenvalues which were filtered out.

2) Also problems with degenerate eigenvalues occured in some of our
tests - we will investigate it and if this is ScalaPacks fault we will
report on it in more detail.

Greetings

Michal

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From: George Fann <d3g270@faddeeva.pnl.gov>

>
> Dear Colleague,
> In order to improve ScaLAPACK we are trying to understand how
> people are using the software. Your feedback is important.
> Could you take a moment to answer three questions.
>
> Are you currently using ScaLAPACK?  Yes
>
> What are your applications and sizes of problems?

Our application is in electronics structures calculations for
quantum chemistry problems: LU, choleski, matrix inversion,
symmetric and hermitian eigensystem problems

The problem sizes: 1000 to 10000
>
> What kinds of machines are you using to solve
> linear algebra problems? SGI PowerChallenge Array, IBM SP2 and SP1,
Intel Paragon, Cray T3D, Cray C90, Clusters of unix workstations
KSR-2

>
> Any comments and suggestions for improvement are welcome.

Smaller scratch space requirement and reduce latency and improve
portability of BLAS ( this has in part been remedied by the MPI port
but MPI is not as stable as it should be and mpich.1.12 is not backward
compatible ).

Thanks for setting a standard for academia, industry and the user community.

> Please email the information to scalapack-survey@cs.utk.edu.
>
> Your help is much appreciated.
>
> Best wishes,
> The ScaLAPACK Project Team
>
> p.s.  This message is being sent to people who have obtained ScaLAPACK
> over the net.  You have not been added to any mailing list.
>

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From: IFF081@DJUKFA11.BITNET
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Organization: Forschungszentrum Juelich GmbH

Dear Colleagues,

I am currently using ScaLAPACK. My application concerns electronic-structure calculations for solids and requires inversion of large complex matrices of size 1728 or 4096 (and perhaps 8000 in the future).

I use the Intel/Paragon XP/S 10.

I had some difficulties to understand how to apply ScaLAPACK, i.e. how to choose the correct values for the input parameters and how to distribute the matrix. A user's guide (perhaps with templates) would have been helpful. I had the following information available:

lawn55.ps	lawn94.ps	lawn73.ps
lawn95.ps	lawn100.ps	lawn80.ps
lawn43.ps	lawn92.ps	

With best wishes,

Rudolf Zeller

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