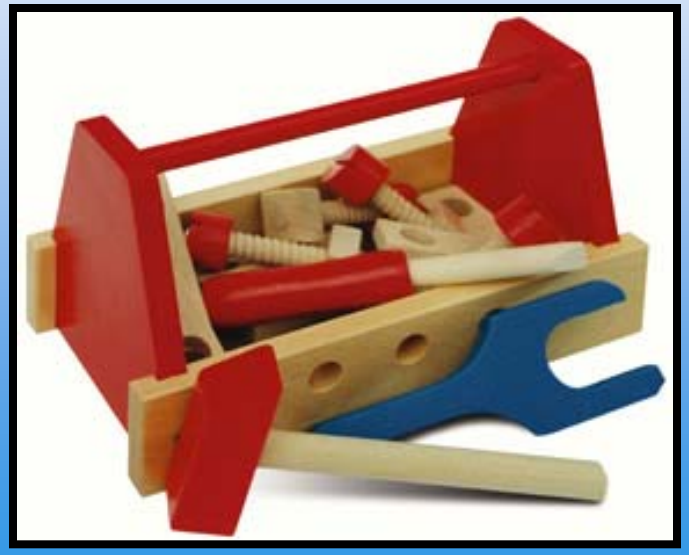
Introduction

Kelly Davis

kdavis@aei.mpg.de

MPI-AEI



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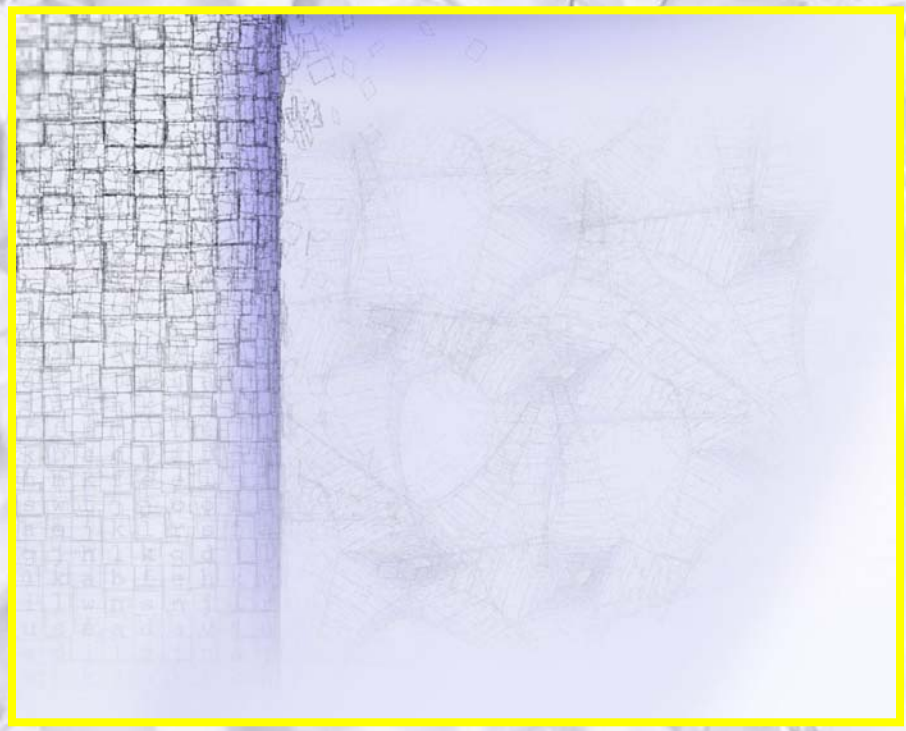
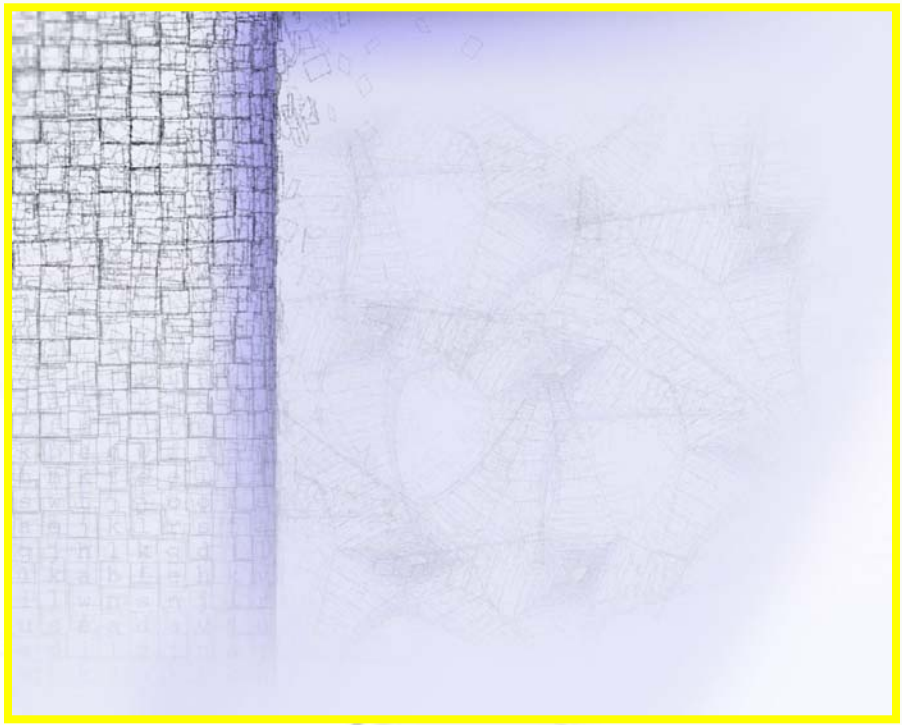
Introduction: Outline

- Speaker Background
- GridLab Background



Speaker Background

- High energy theoretical particle physicist
- Spent a number of years in software industry
- Joined the GridLab project two years ago



GridLab Background

- EU Project Funded by 5th Framework
  - PSNC, AEI, ZIB, MASARYK, SZTAKI
  - ISUFI, Cardiff, NTUA, Chicago, ISI
  - Wisconsin, Sun, Compaq,…
- 12 Work Packages covering
  - Grid Portals
  - Mobile Users
  - Grid Services
  - Applications
  - Testbed
  - GAT: Grid Application Toolkit

Why GAT?

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kdavis@aei.mpg.de

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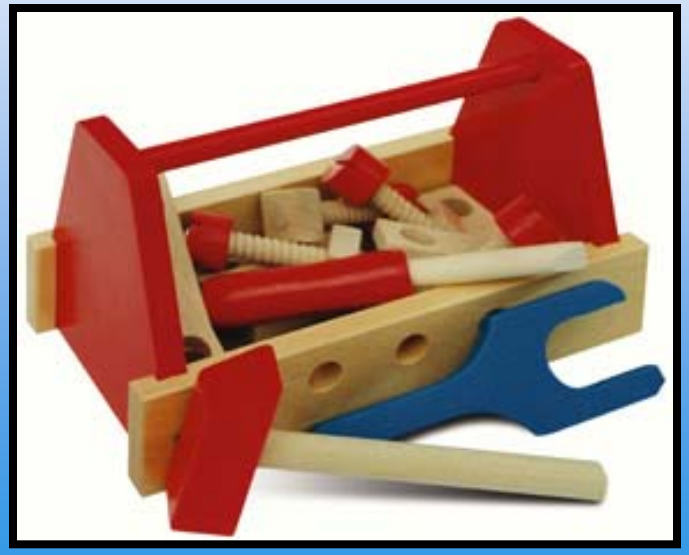


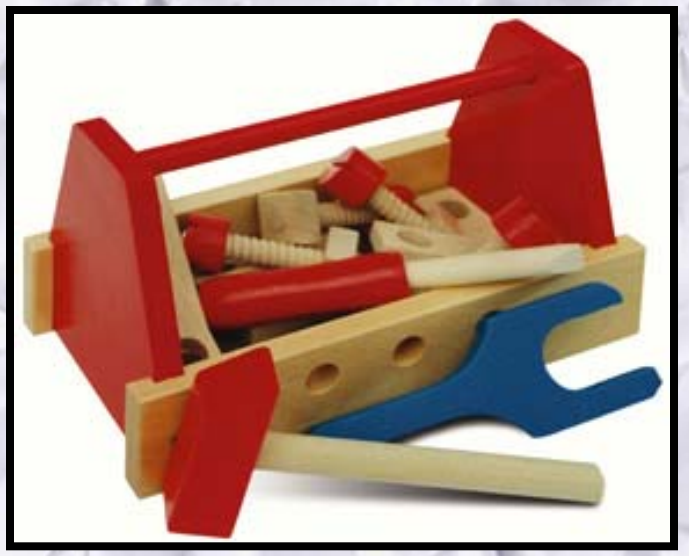
Why GAT?: Outline

- What is GAT?
- Why GAT?
- What can GAT do?
  - File Management
  - FileStream Management
  - LogicalFile Management
  - Advert Management
  - Job Management
  - Monitoring
  - And more…

What is GAT?

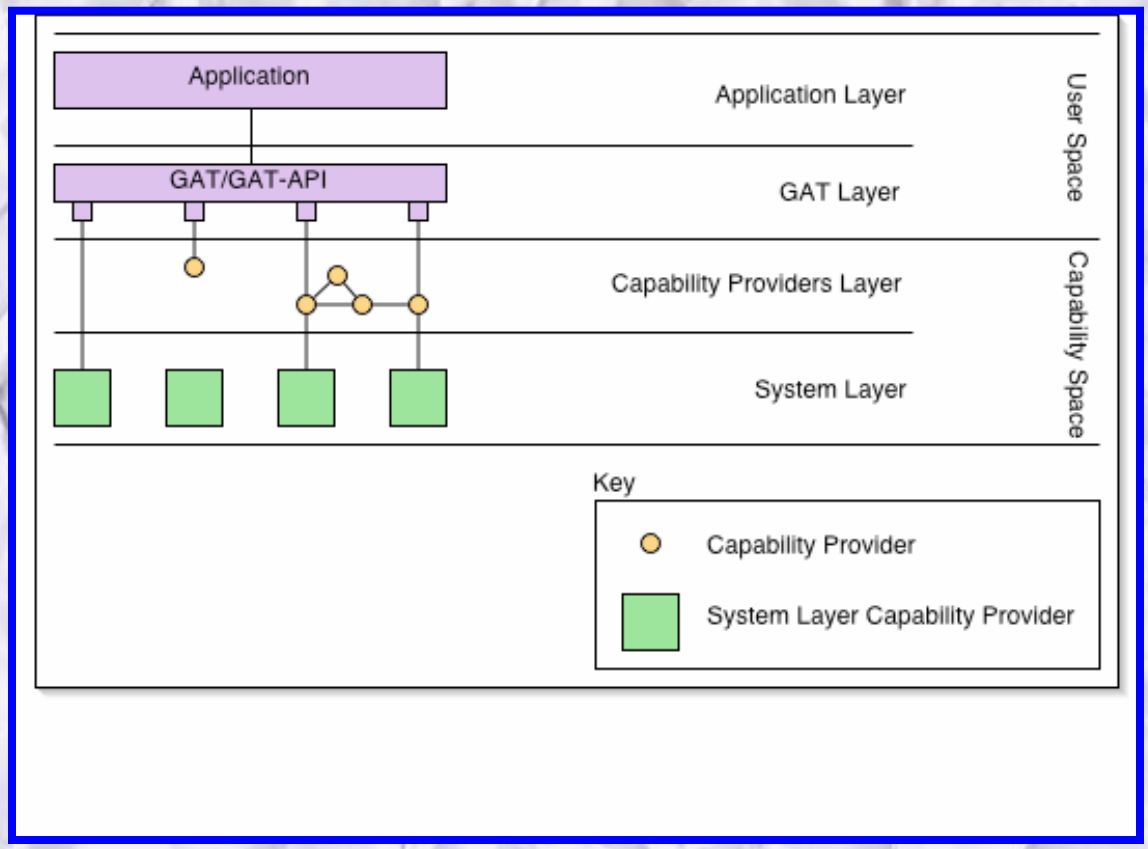
GAT is…?

…an API and toolkit for developing and running portable grid apps independently of the underlying grid infrastructure and available services

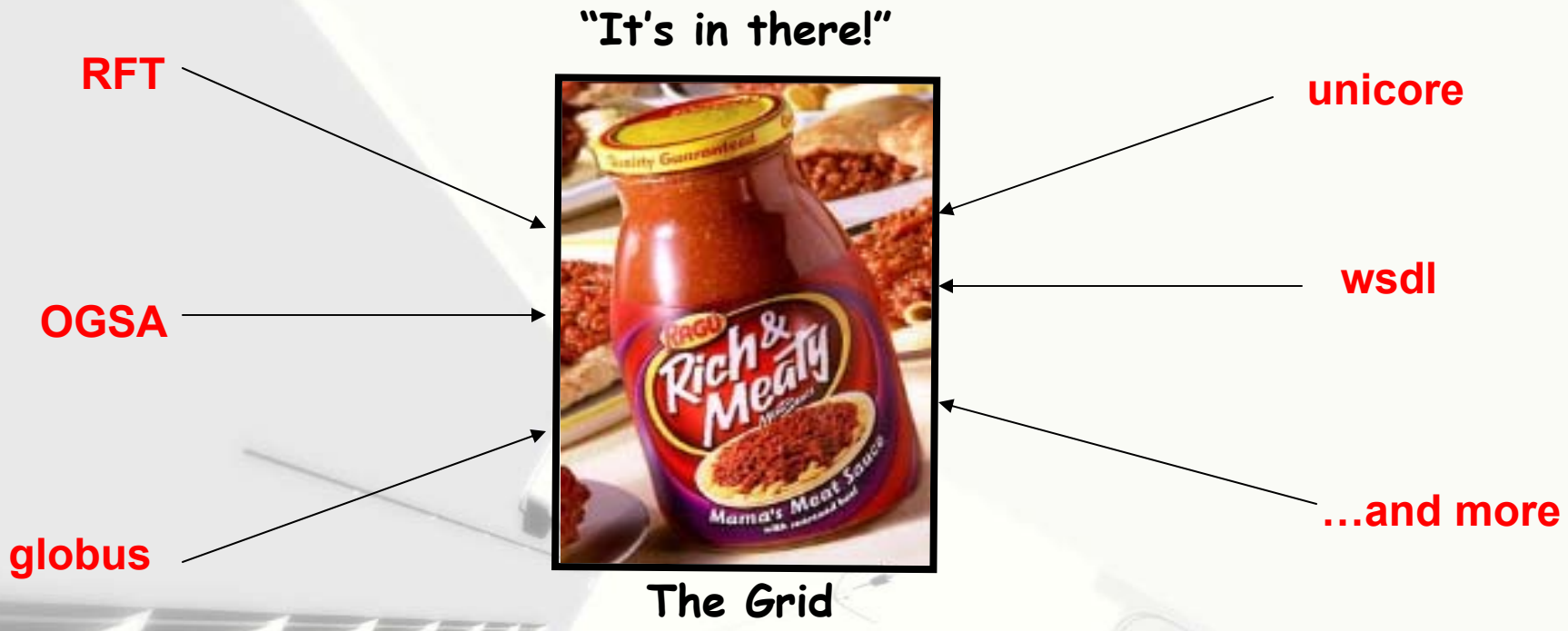


What is GAT?

GAT is…?



Why GAT?


"It's in there!"
RFT
OGSA
globus
unicore
wsdl
…and more
RAGU
Rich & Meaty
Mama's Meat Sauce
The Grid

Why GAT?

…..simplicity

What can GAT Do?

- File Management
  - Move Files
  - Copy Files
  - Delete Files
  - Examine File Properties
  - …and more

…all in a manner independent of the file's location or method of access!

What can GAT Do?

- FileStream Management
  - Read Bytes from a File
  - Write Bytes to a File
  - Seek on a File
  - …and more

…in such a ways as to lift the burden of protocols, security, and other details from the user's shoulders!

What can GAT Do?

- LogicalFile Management
  - Replicates files
  - …and more

…so as to maximize use of available network bandwidth and never have to worry about the details of security,protocols, Globus…

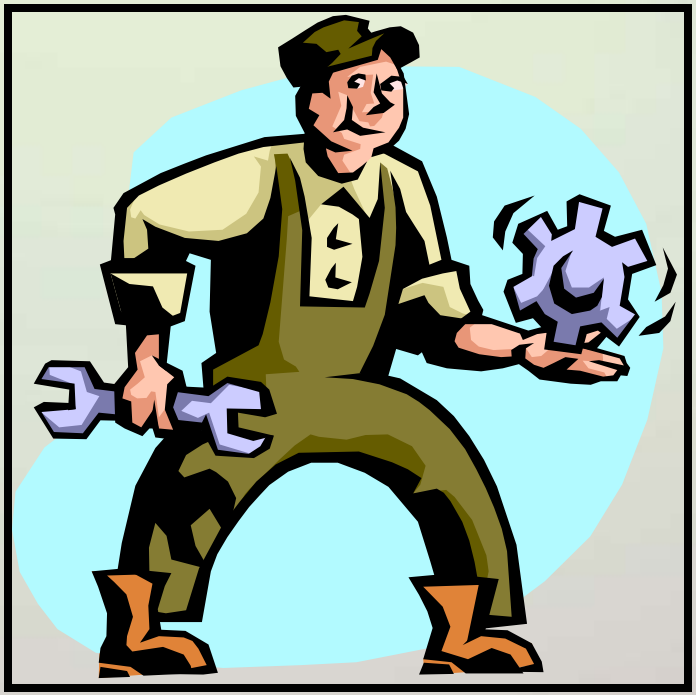
What can GAT Do?

- Advert Management
  - Persist objects
  - Query for persisted objects
  - Move objects across machine boundaries
  - Move objects across language boundaries
  - …and more

…so as to never yoke the application programmer with the details. It just works!

What can GAT Do?

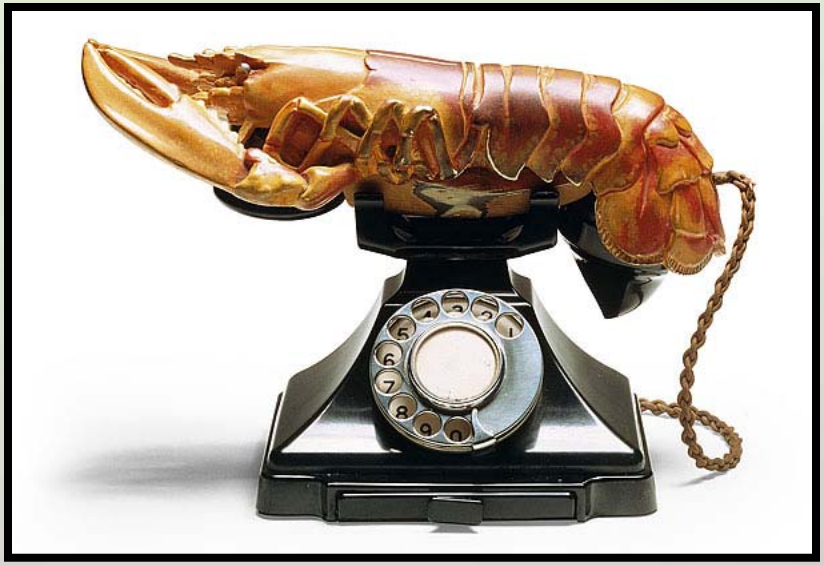
- Job Management
  - Schedule Jobs
  - Un-Schedule Jobs
  - Stop Jobs
  - Checkpoint Jobs
  - Migrate Jobs
  - …and more



…while not bothering the user with the details of traditional job management systems such as Condor, Globus, Unicore…

What can GAT Do?

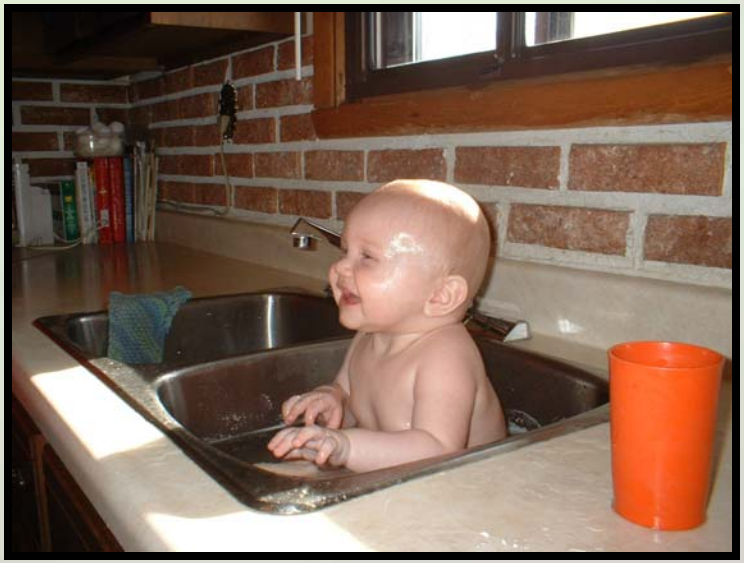
- Monitoring
  - Monitor almost anything
  - Monitor continuous events
  - Monitor “event-like” events
  - Allows GAT application to be monitored
  - …and more



…while the user never needs to know the details of Mercury, NWS, or any other monitoring system.

What can GAT Do?

- …and More
  - Explore Resources on “The Grid”
  - Obtain Resource Reservations
  - Instrument GAT Applications for Checkpointing
  - Communicate -- socket-like -- between processes
  - ”Everything, *including* the Kitchen Sink”

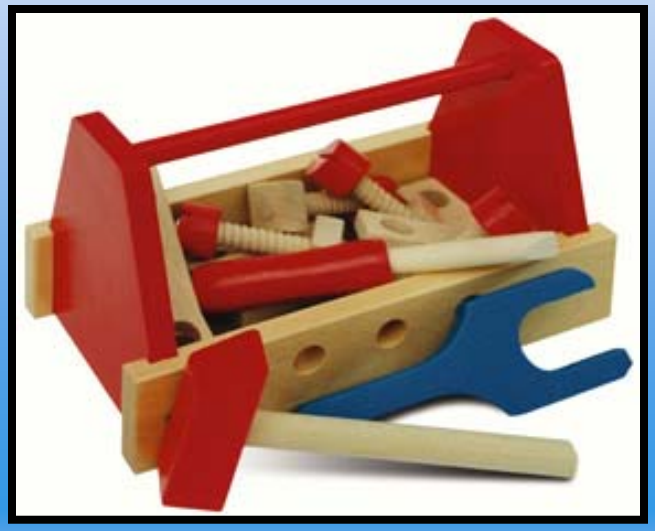


GATObject Model

Kelly Davis

kdavis@aei.mpg.de

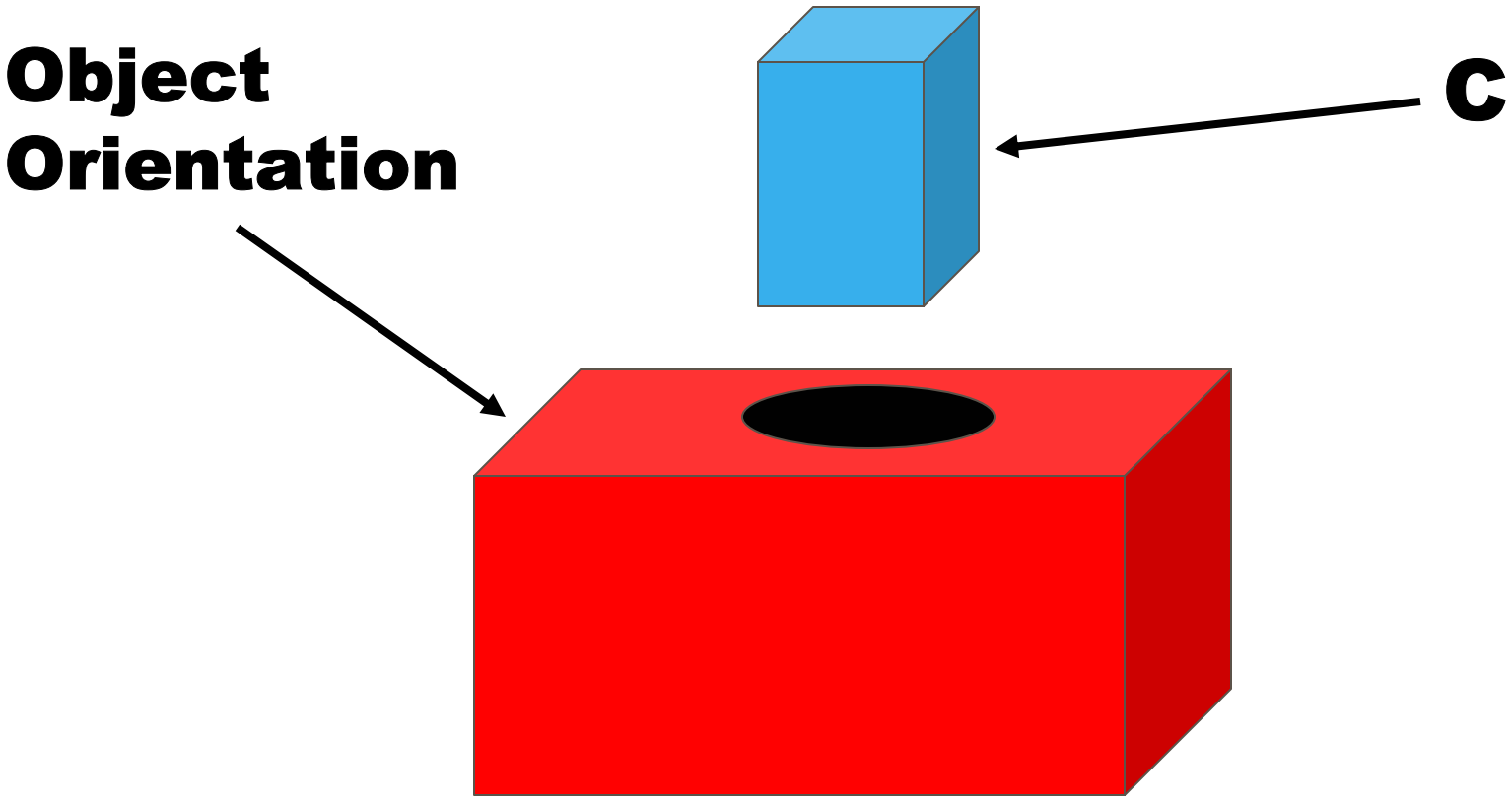
AEI



GATObject Model: Outline

- C ain't OO
- GAT Object Model
- GAT Interface Model
- Examples
  - Getting an object's GATType
  - Determining object equality
- GAT Core Objects

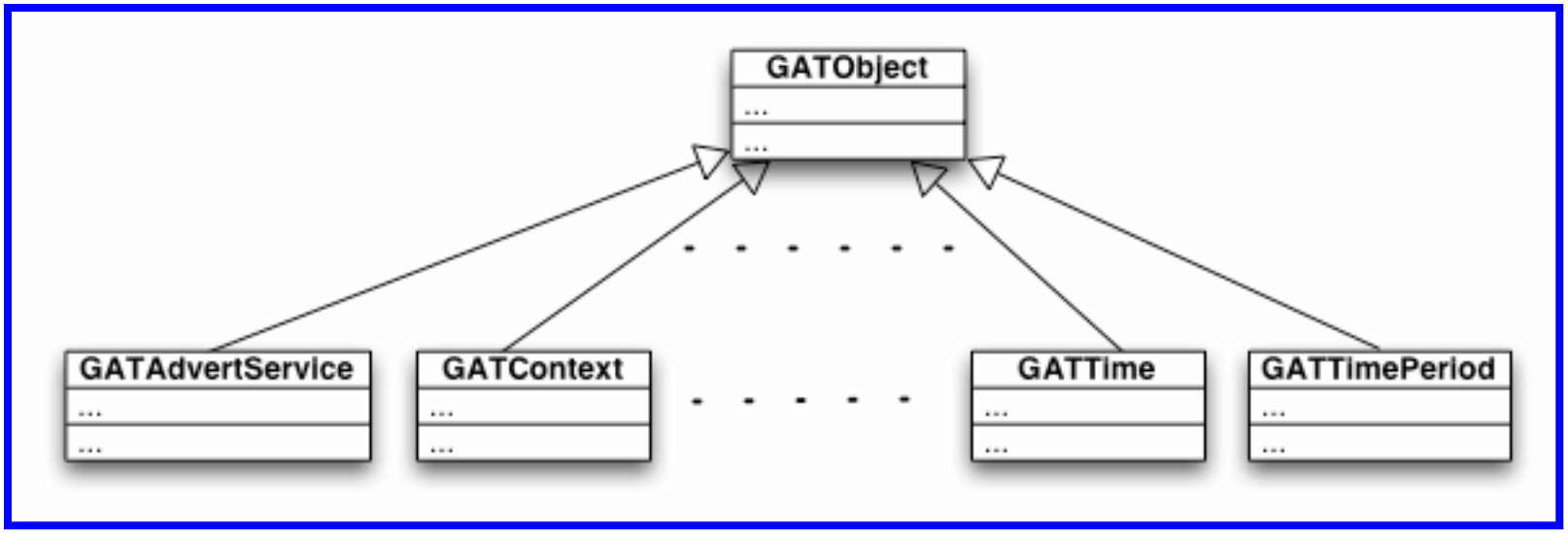
C ain't Object Oriented



"Square Peg in a Round Hole"

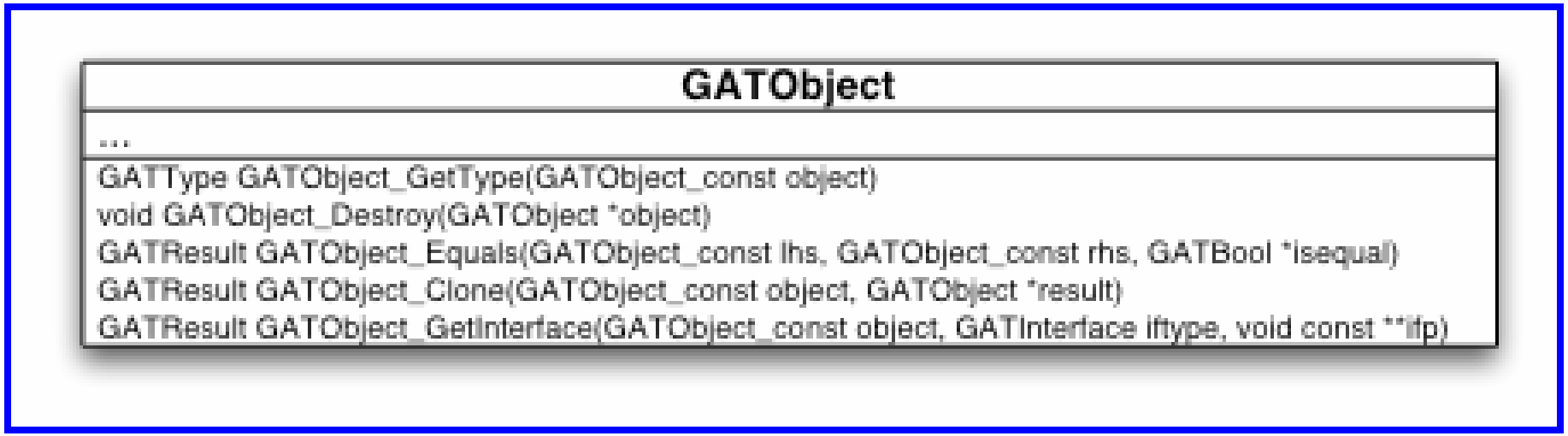
GAT Object Model

The GAT "inheratence" tree…

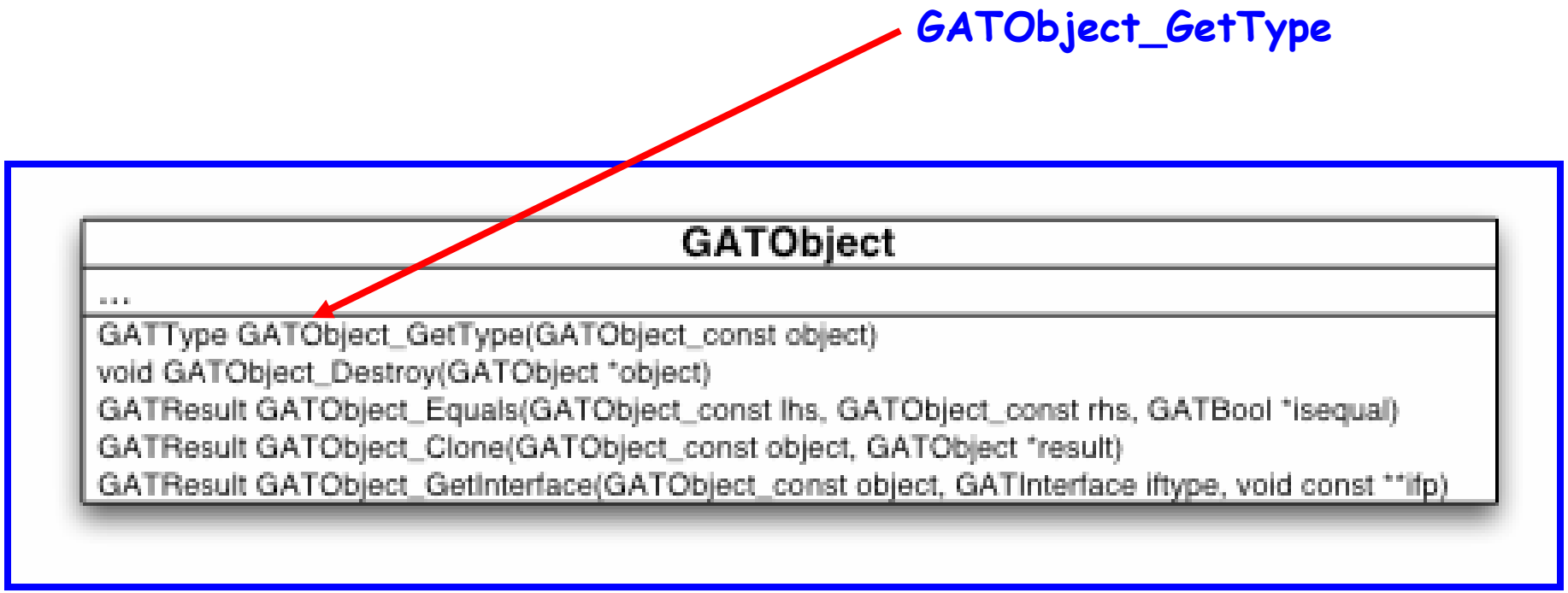


GAT Object Model

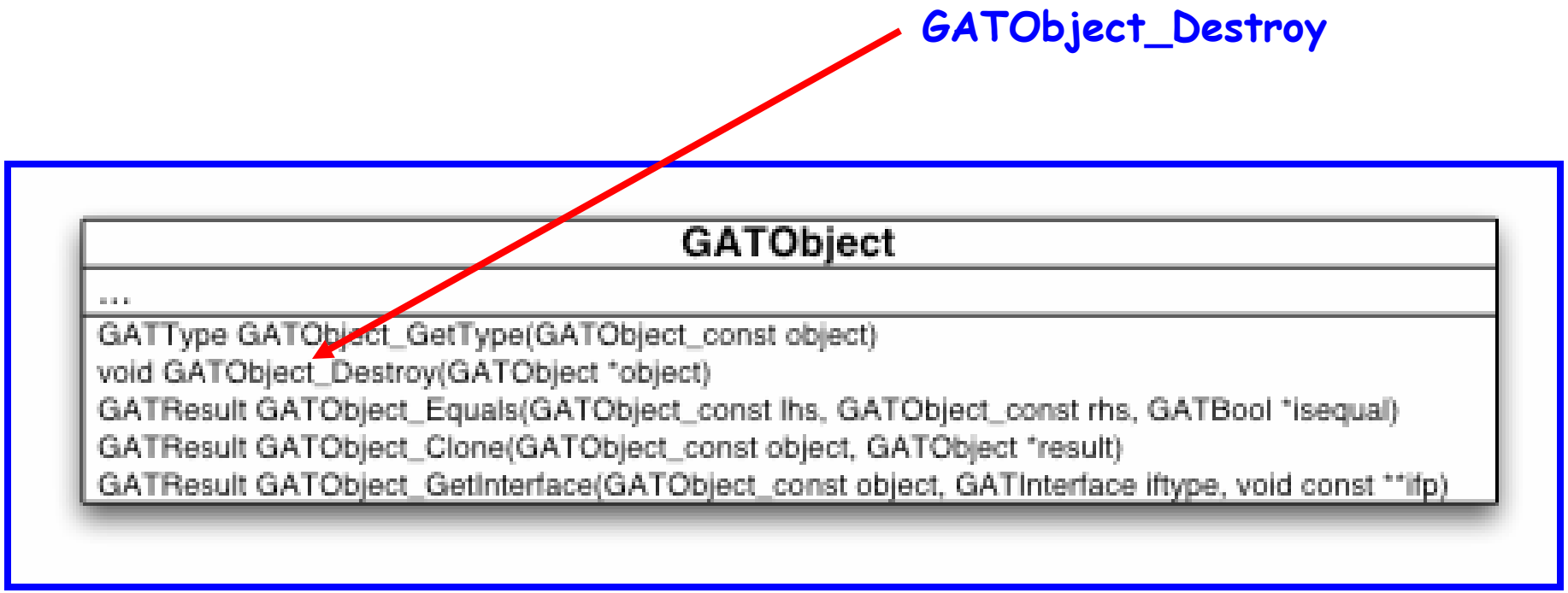
The GATObject …



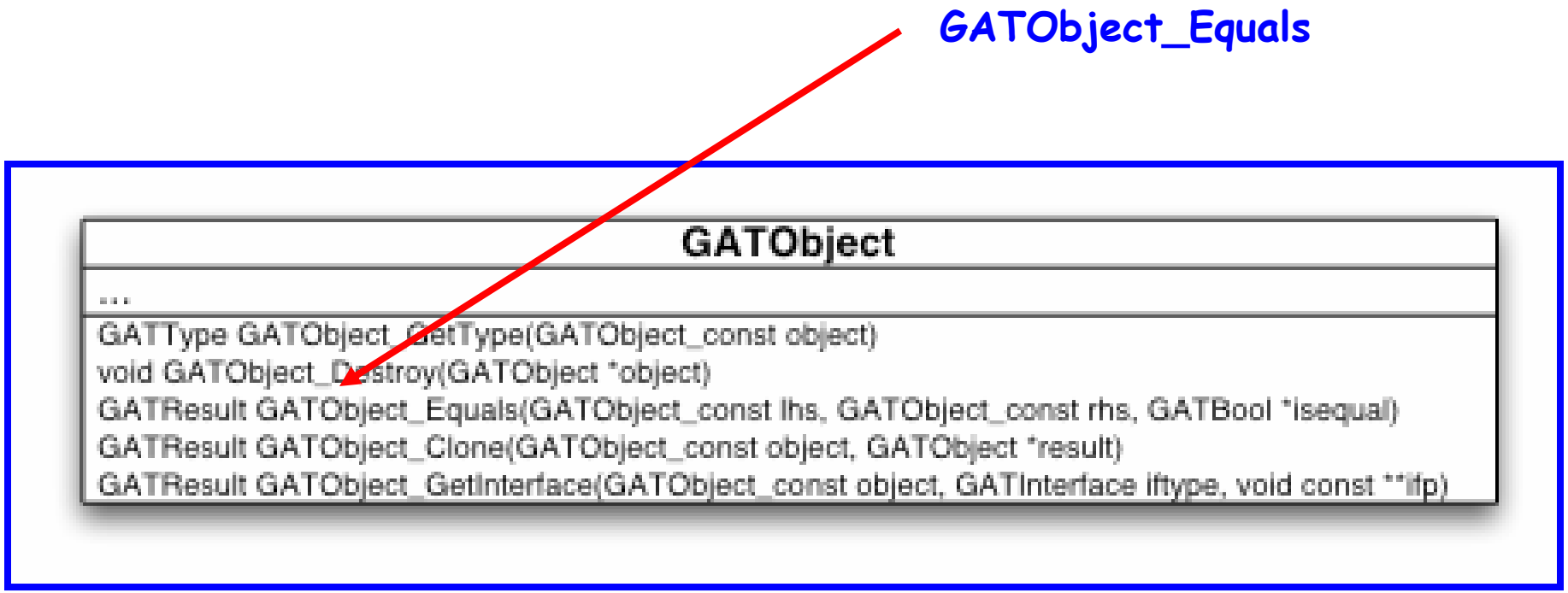
GAT Object Model



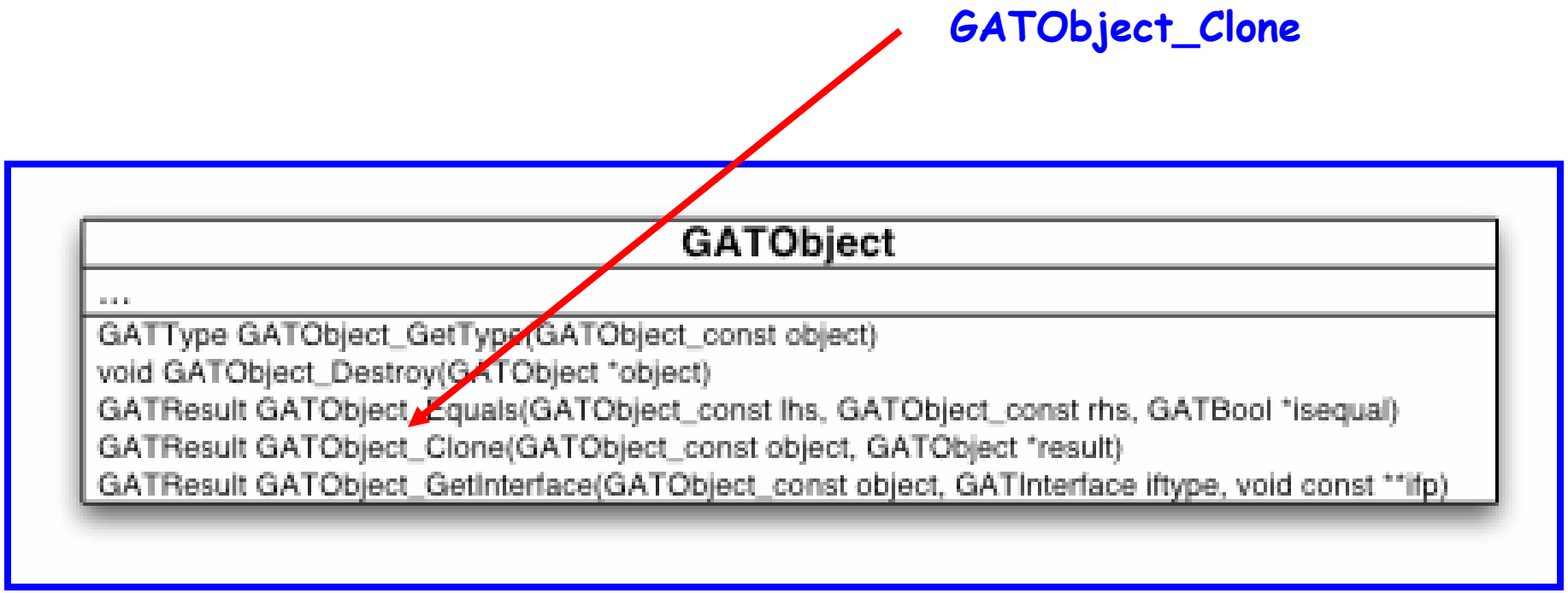
GAT Object Model



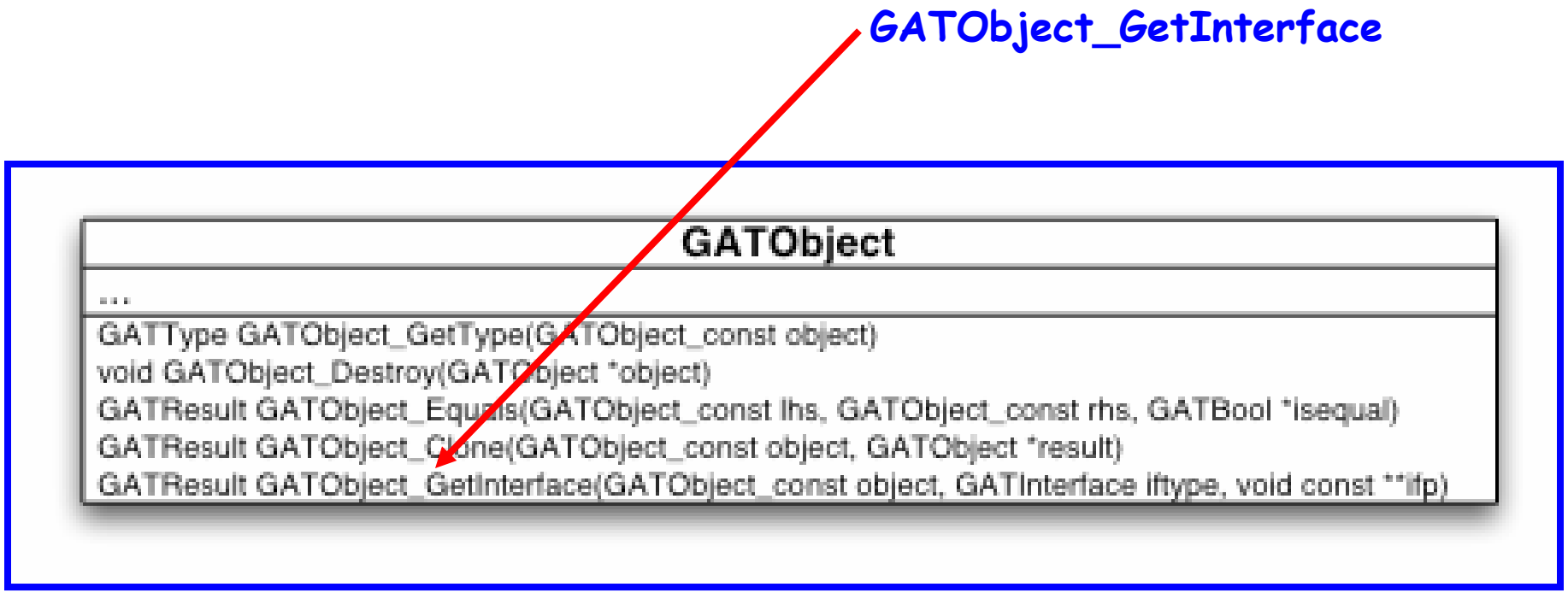
GAT Object Model



GAT Object Model

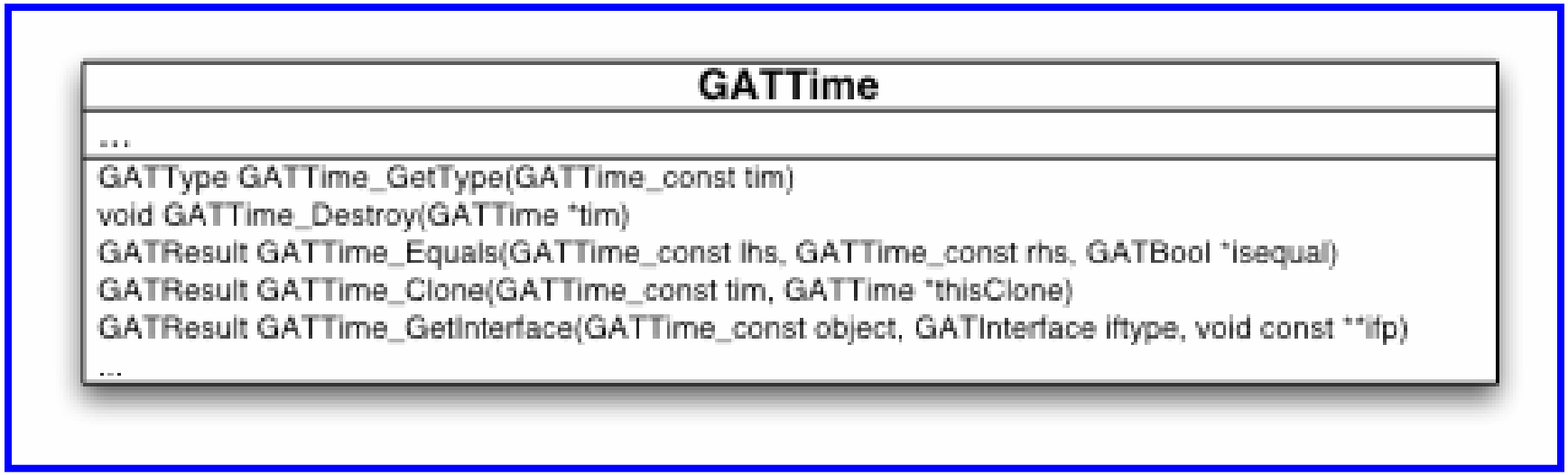


GAT Object Model



GAT Object Model

Example: GATTime…



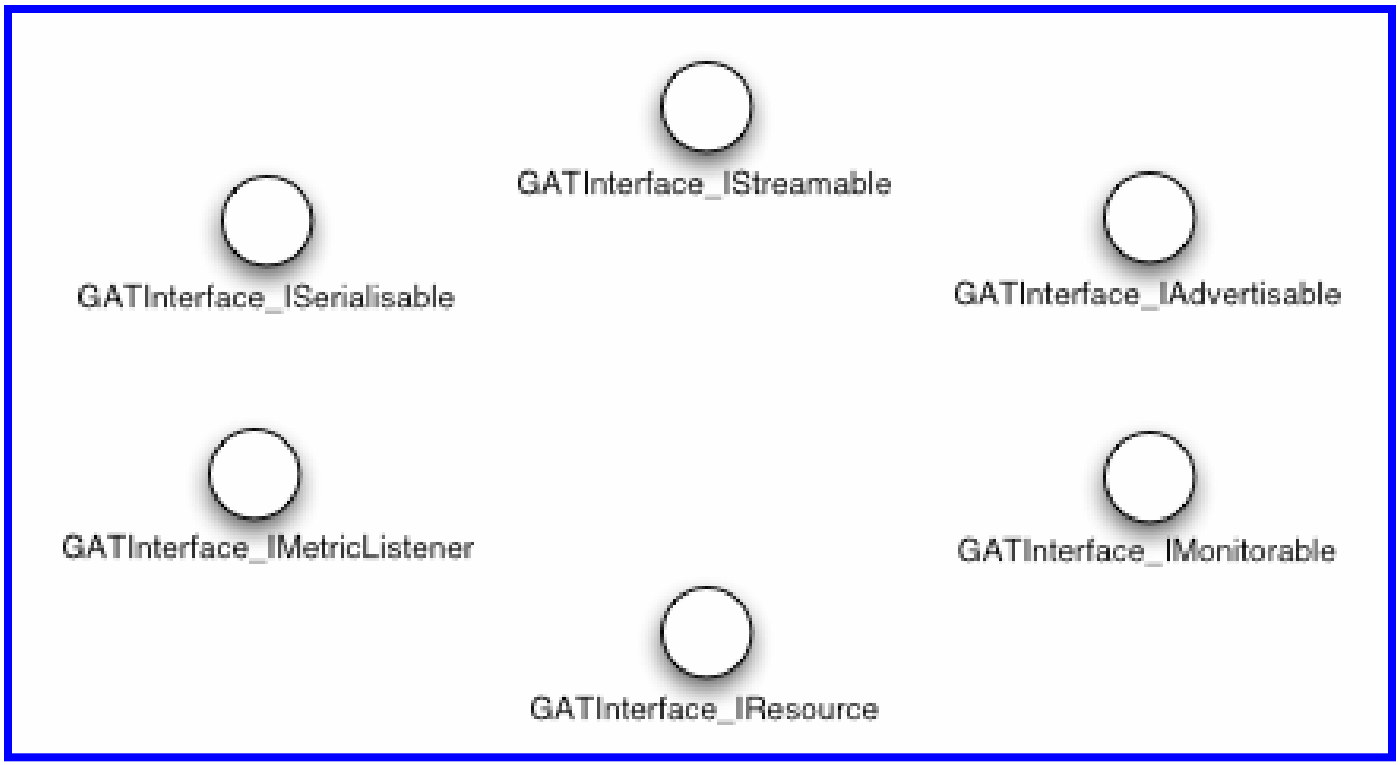
GAT Object Model

GATObject casting functions…

```
GATTime GATObject_ToGATTime(GATObject object)
GATObject GATTime_ToGATObject(GATTime derived)
GATTime_const GATObject_ToGATTime_const(GATObject_const object)
GATObject_const GATTime_ToGATObject_const(GATTime_const derived)
```

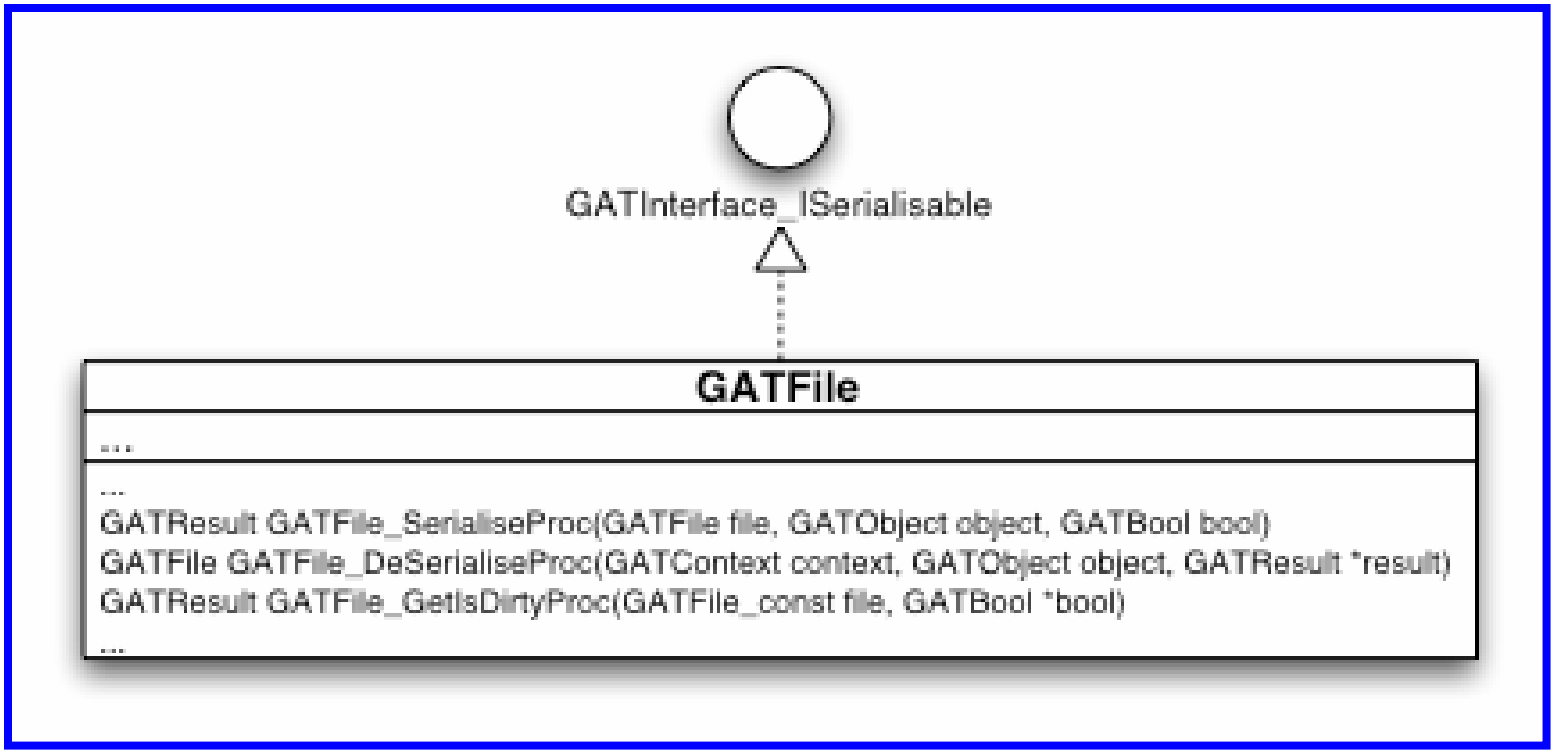
GAT Interface Model

GAT interfaces…



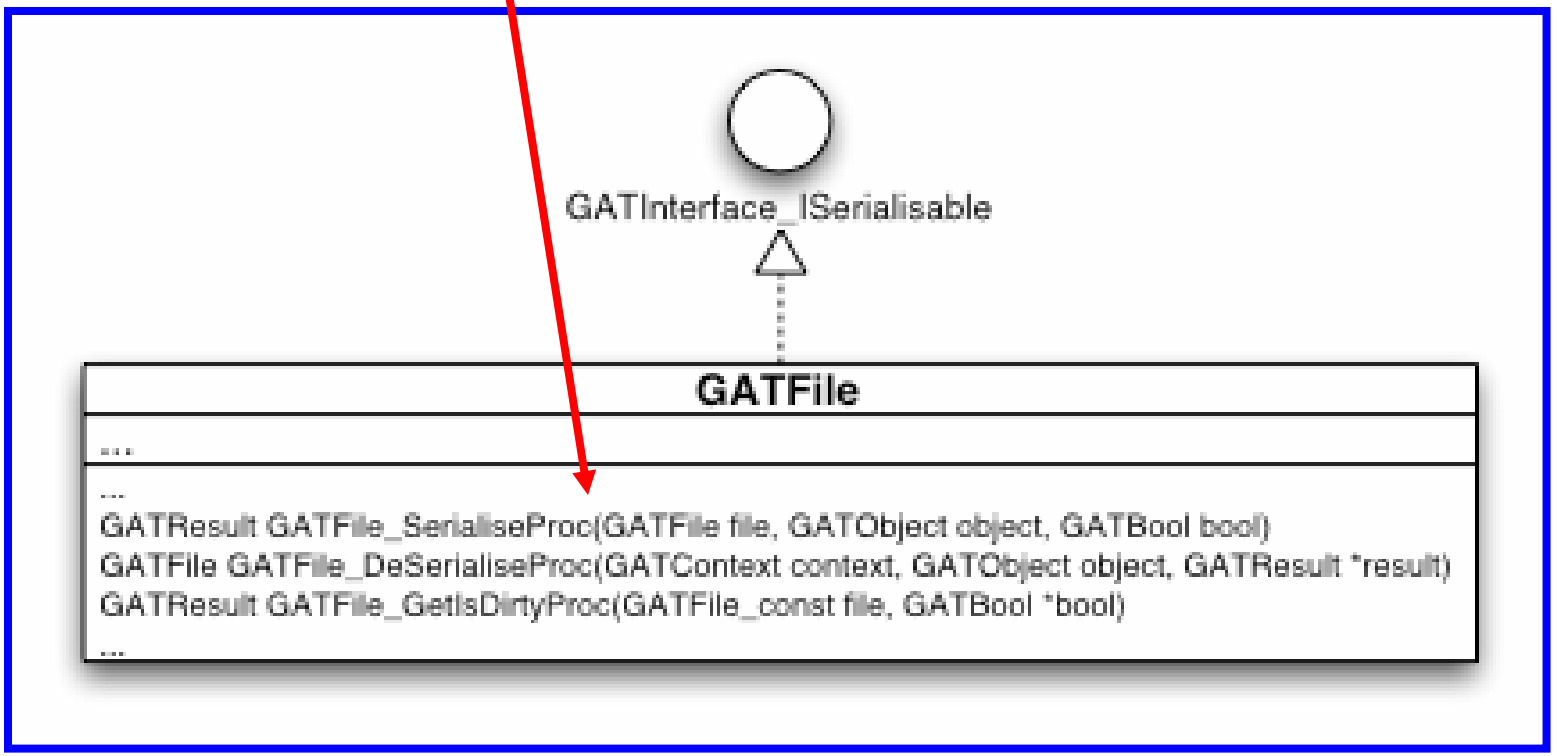
GAT Interface Model

Example: GATFile…

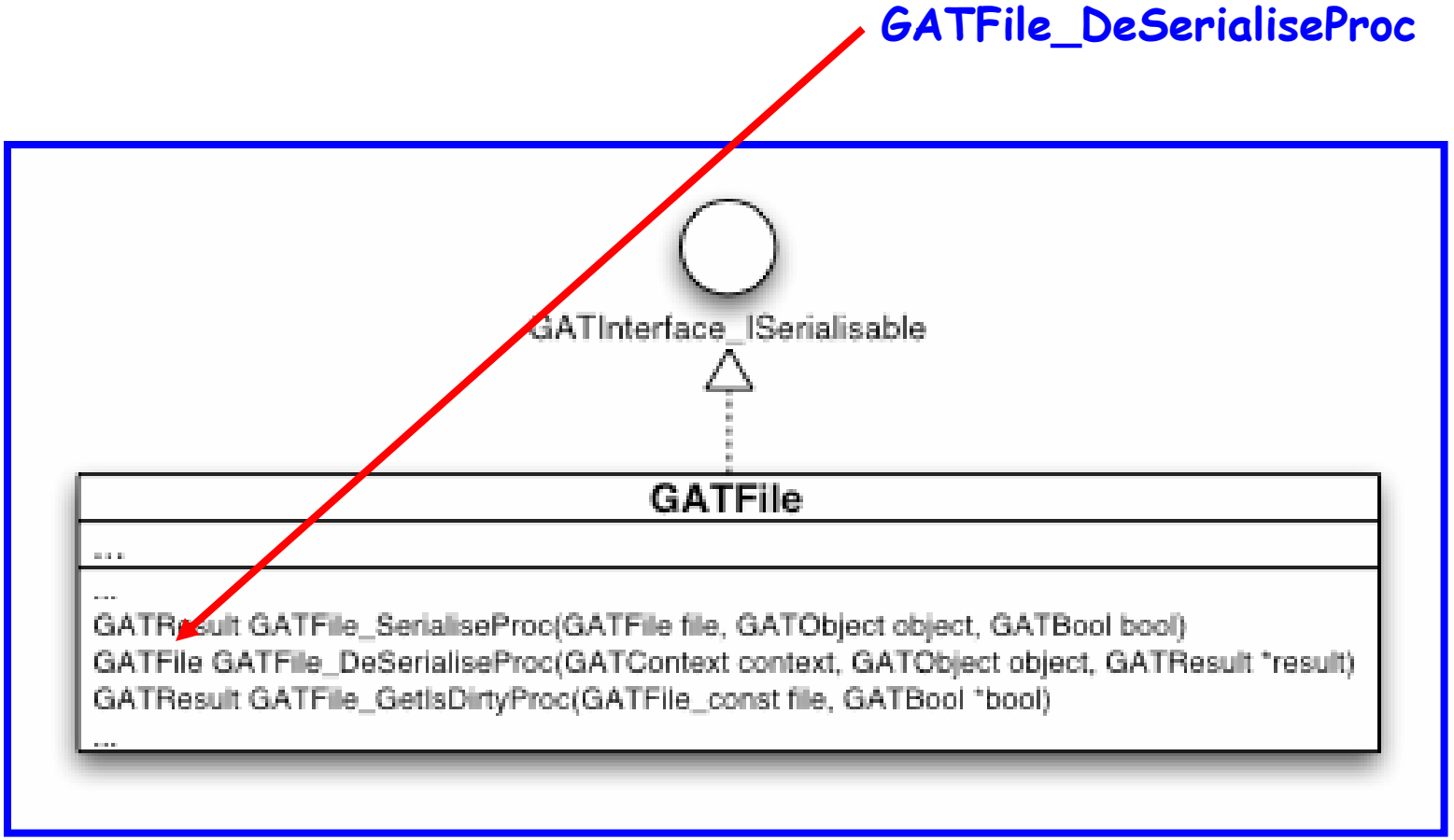


GAT Interface Model

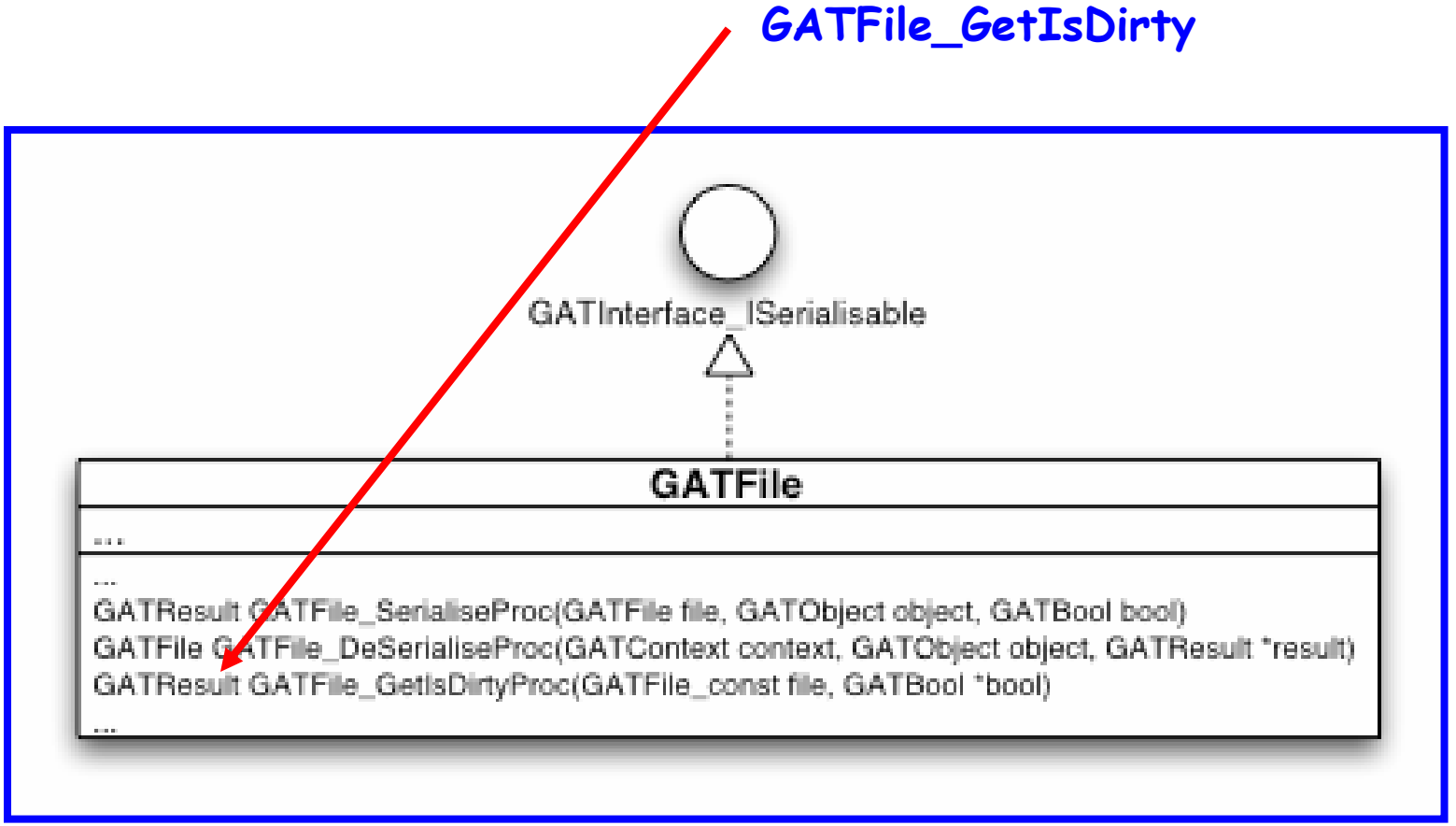
GATFile_SerialiseProc



GAT Interface Model



GAT Interface Model



Examples…

- Getting an Object's Type

```
#include "GAT.h"

int main(void)
{
  GATType type;
  GATTime time;

  /* Create a GATTime corresponding to now */
  time = GATTime_Create(0);

  /* Obtain the GATType of the GATTime time */
  if( NULL != time )
  {
    type = GATTime_GetType(time);

    /* Destroy the GATTime time */
    GATTime_Destroy( &time );
  }

  return 0;
}
```

Examples…

- Determining Object Equality

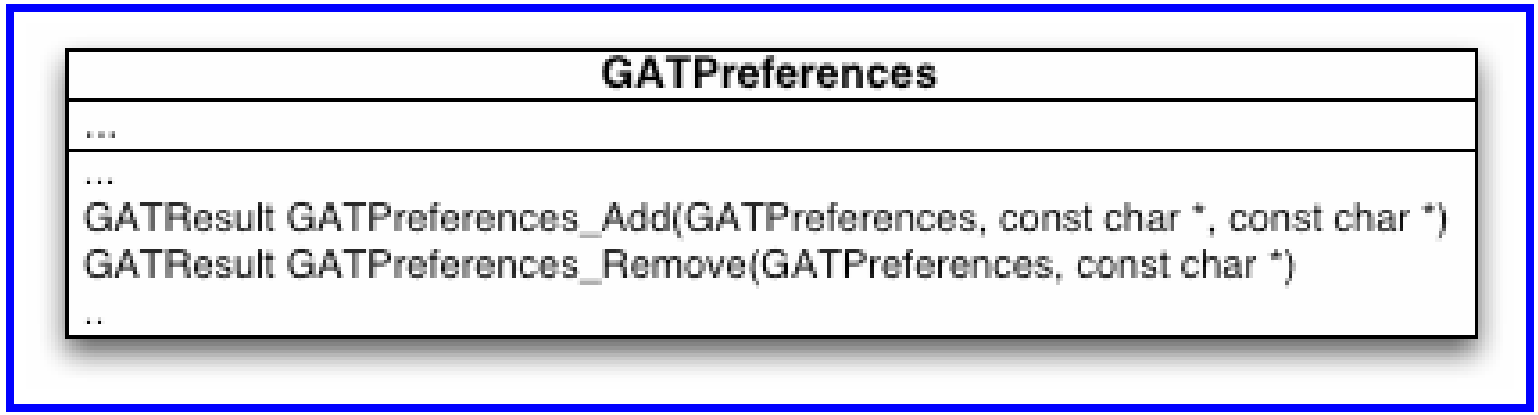
```
…
/* Determine semantic equivalence of timeOne and timeTwo */
  if( (NULL != timeOne) && (NULL != timeTwo) )
  {
    result = GATTime_Equals( timeOne, timeTwo, &isequal );
    if( GAT_SUCCEEDED( result ) )
    {
      if( GATTrue == isequal )
      {
        printf( "timeOne and timeTwo are semantically
equivalent\n" );
      }
      else
      {
        printf( "timeOne and timeTwo are not semantically
equivalent\n" );
      }
    }
  }\
…
```

Here's the equals

Core Objects

- GATPreferences

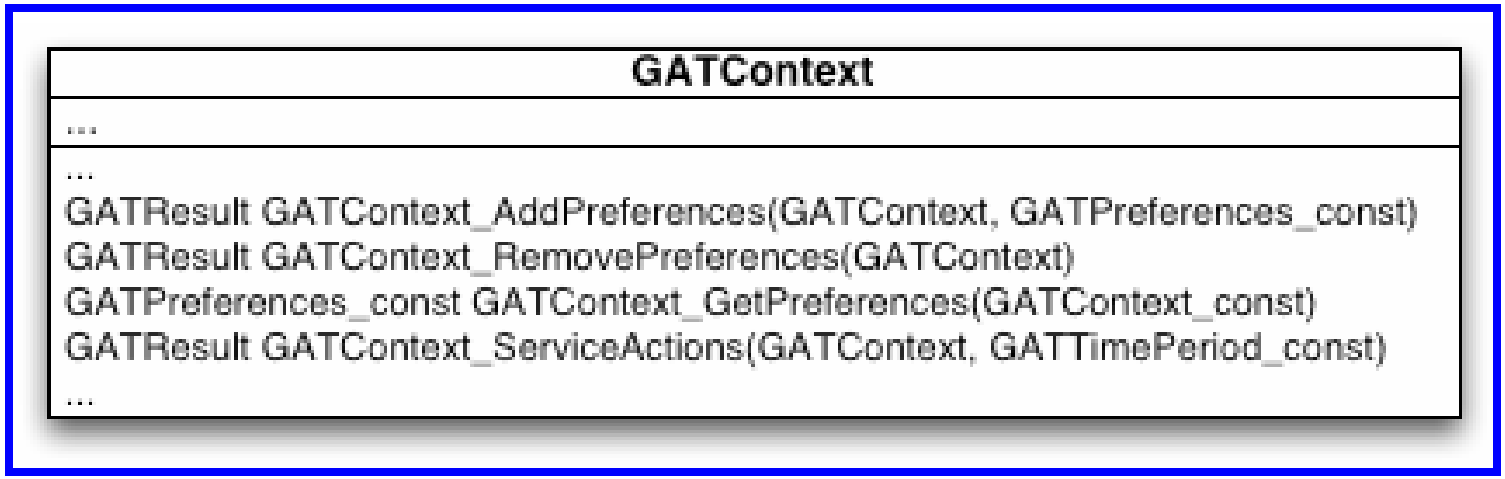
Purpose: To contain user preference info



Core Objects

- GATContext

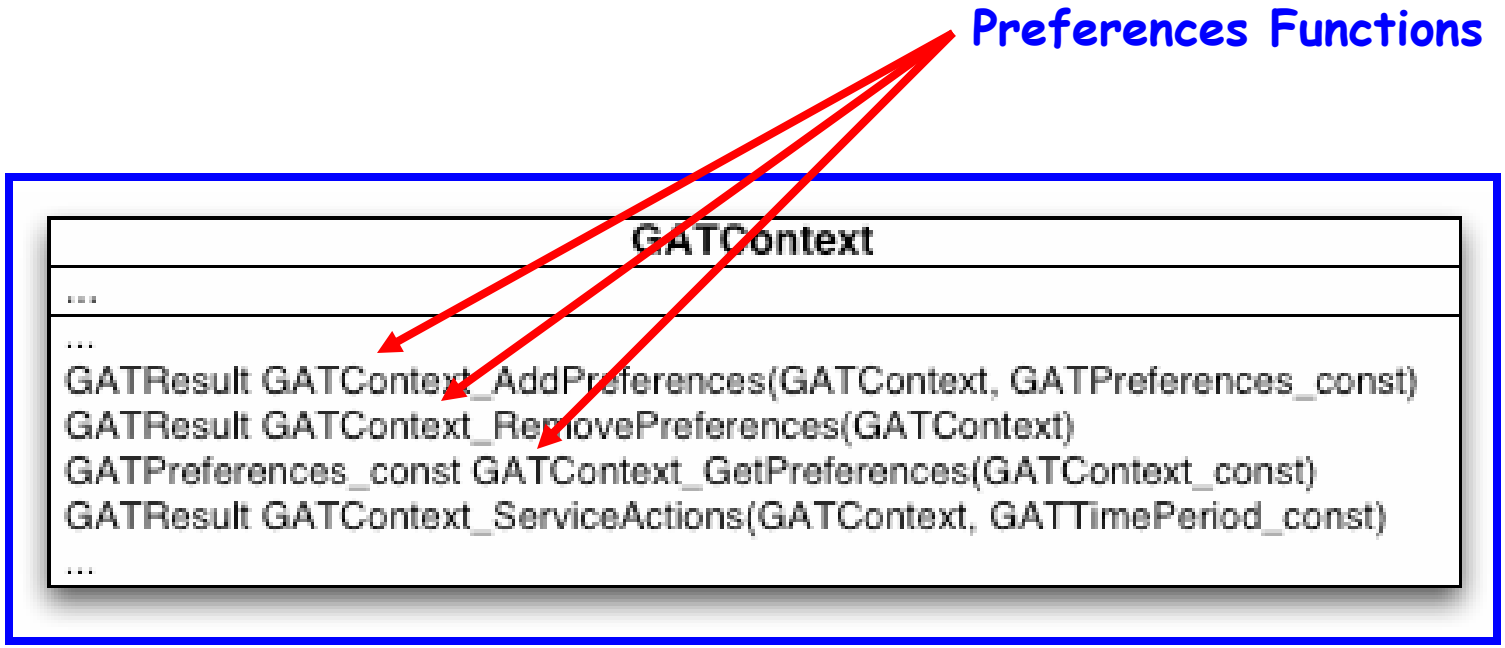
Purpose: To centralize a GAT user's state information



Core Objects

- GATContext

Purpose: To centralize a GAT user's state information

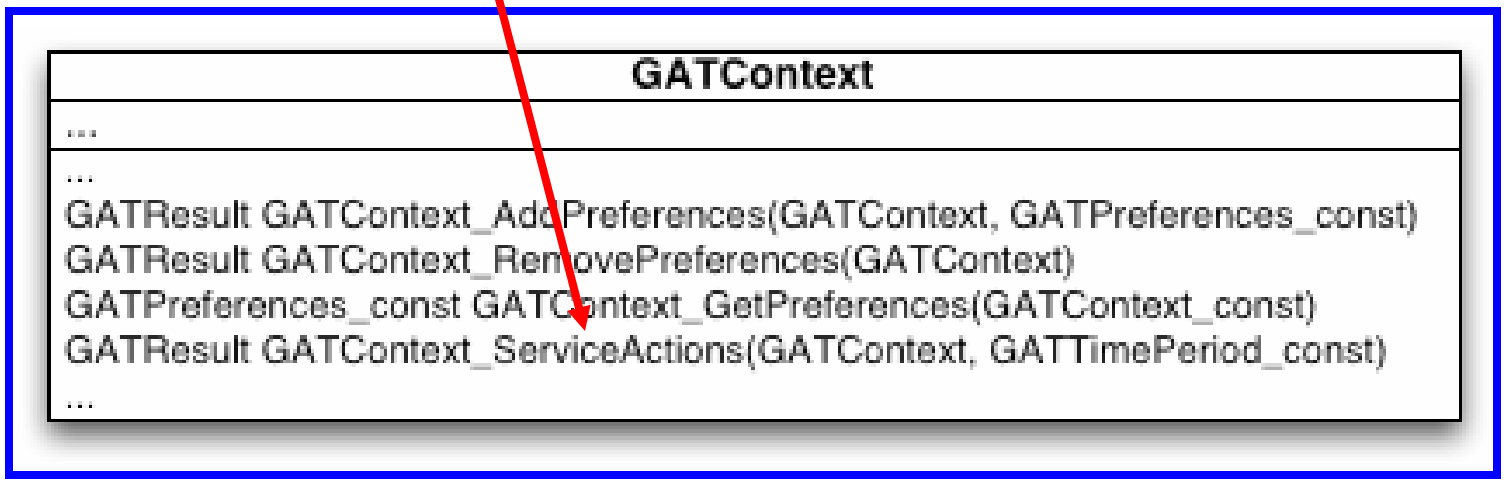


Core Objects

- GATContext

Purpose: To centralize a GAT user's state information

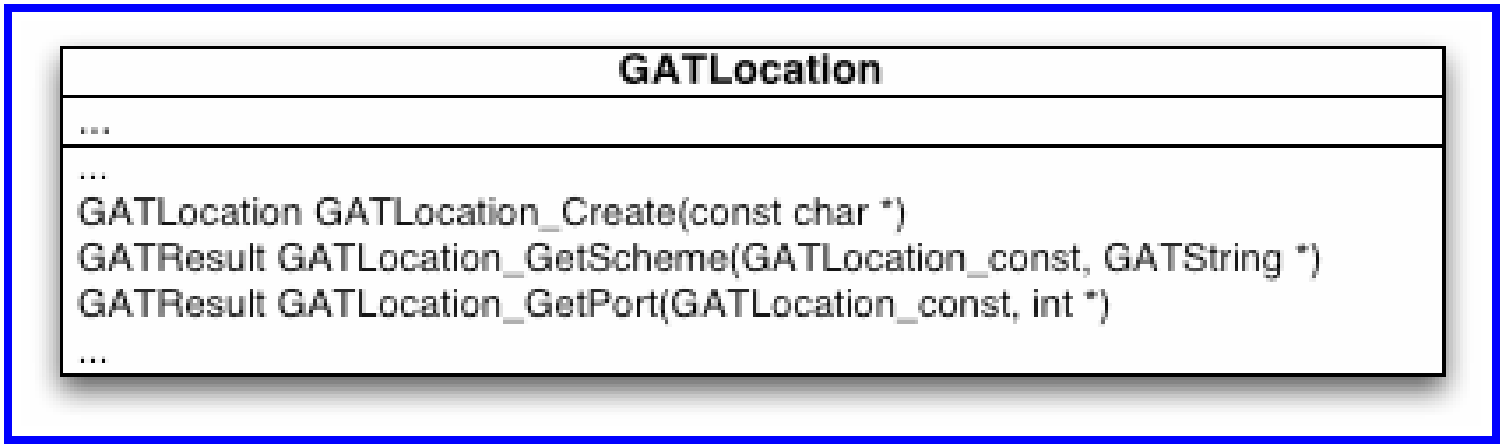
Service actions



Core Objects

- GATLocation

Purpose: To represent a URI

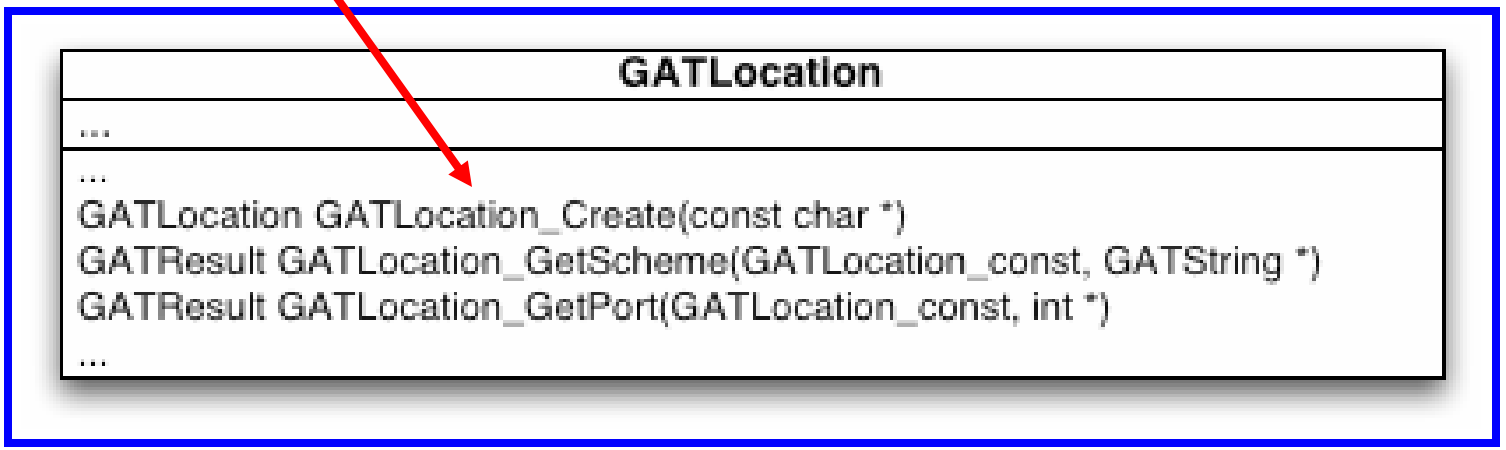


Core Objects

- GATLocation

Purpose: To represent a URI

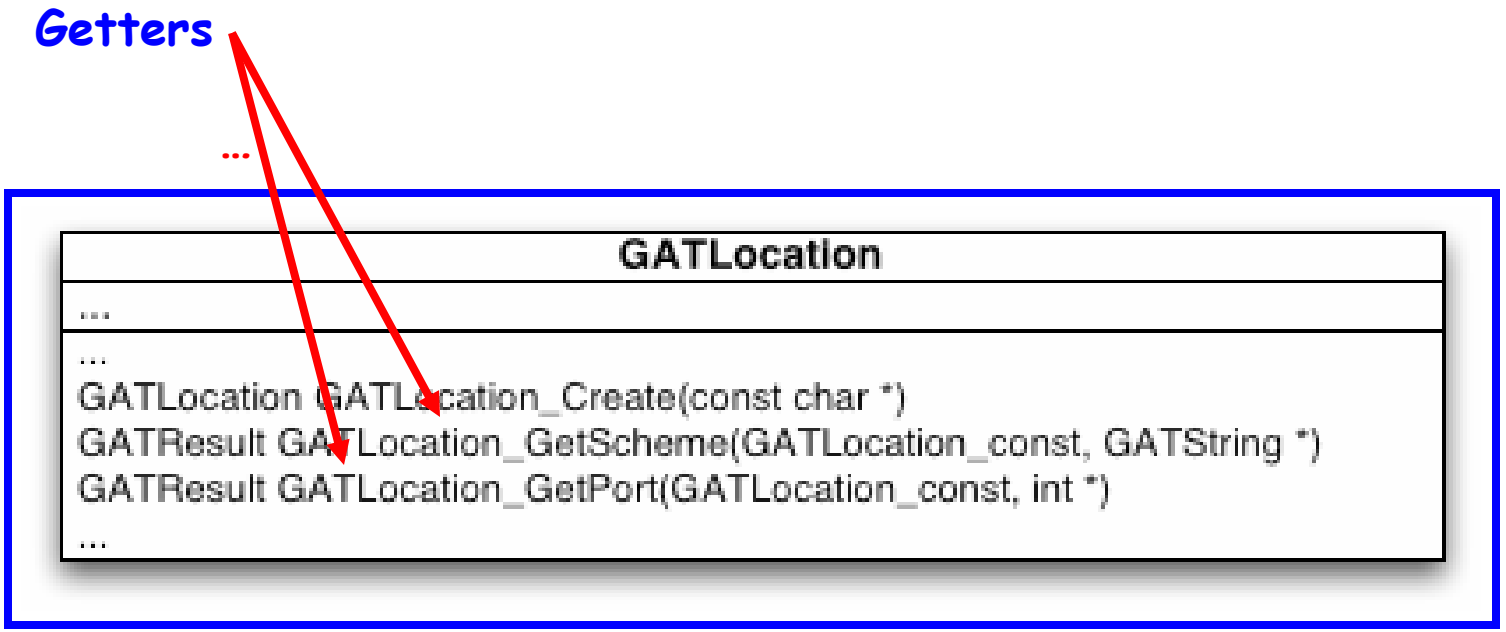
Creation



Core Objects

- GATLocation

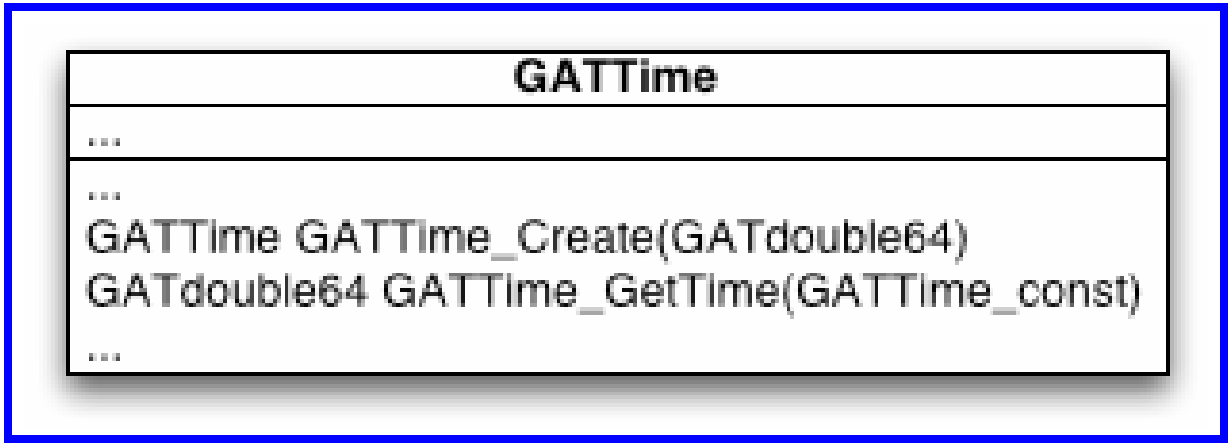
Purpose: To represent a URI



Core Objects

- GATTime

Purpose: To represent an instant in time

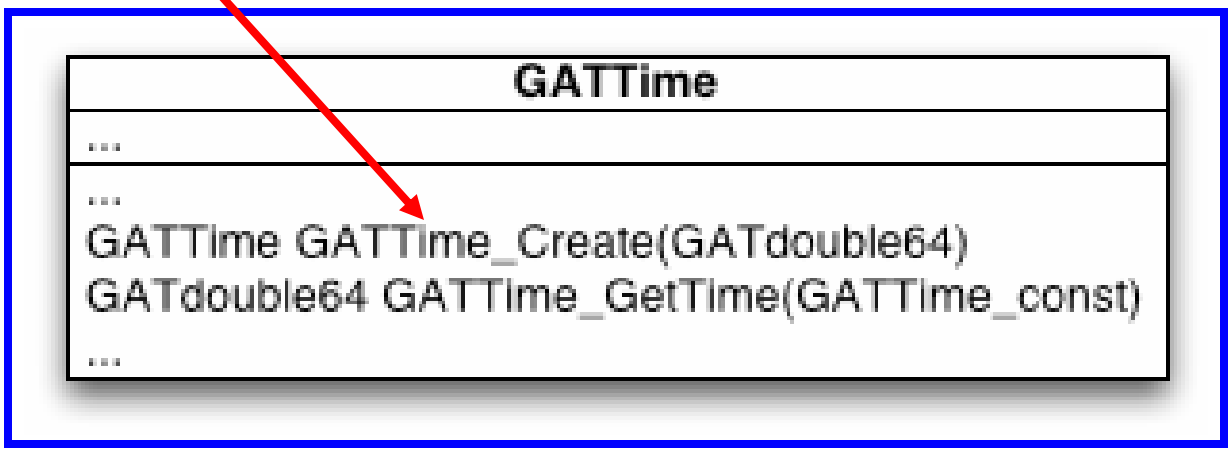


Core Objects

- GATTime

Purpose: To represent an instant in time

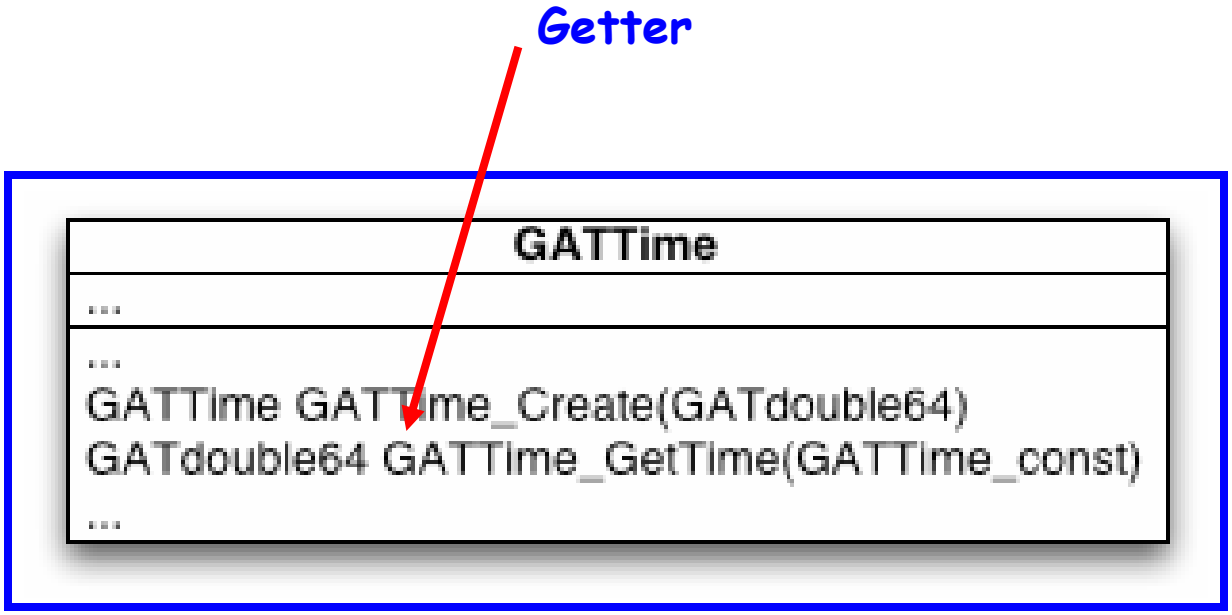
Creation (Seconds after 00:00 hours, Jan 1, 1970 UTC)



Core Objects

- GATTime

Purpose: To represent an instant in time

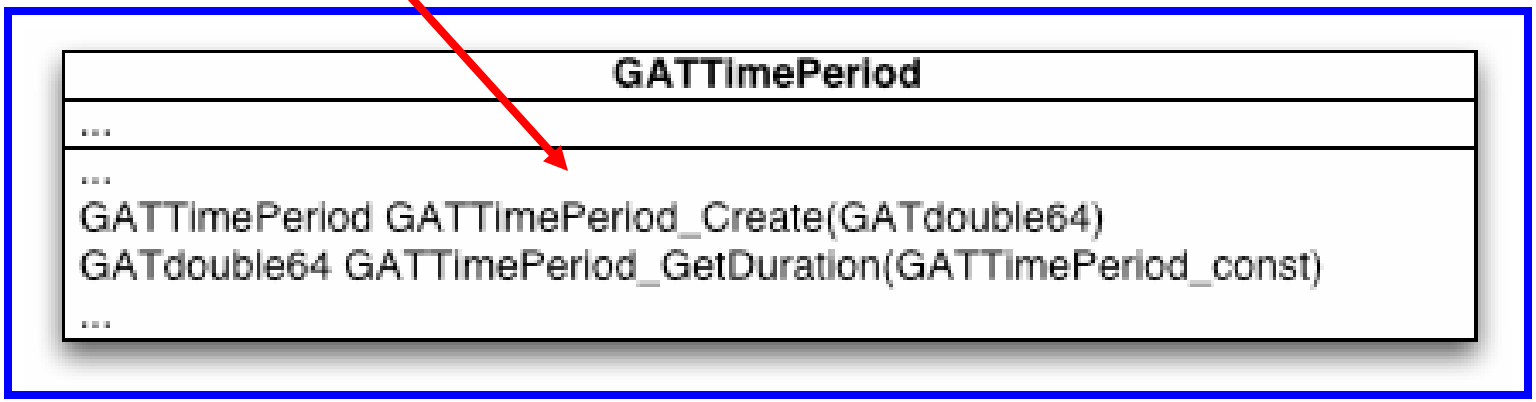


Core Objects

- GATTimePeriod

Purpose: To represent a time duration

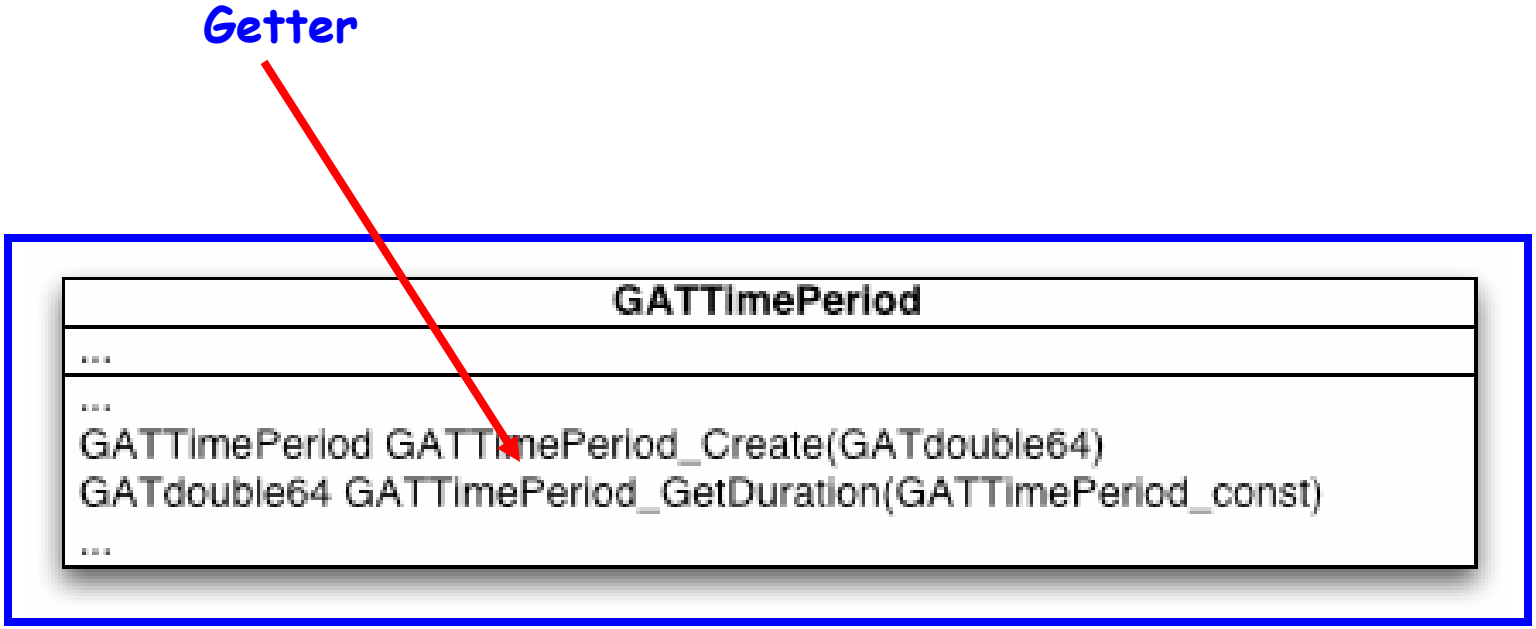
Creation (Duration in Seconds)



Core Objects

- GATTimePeriod

Purpose: To represent a time duration

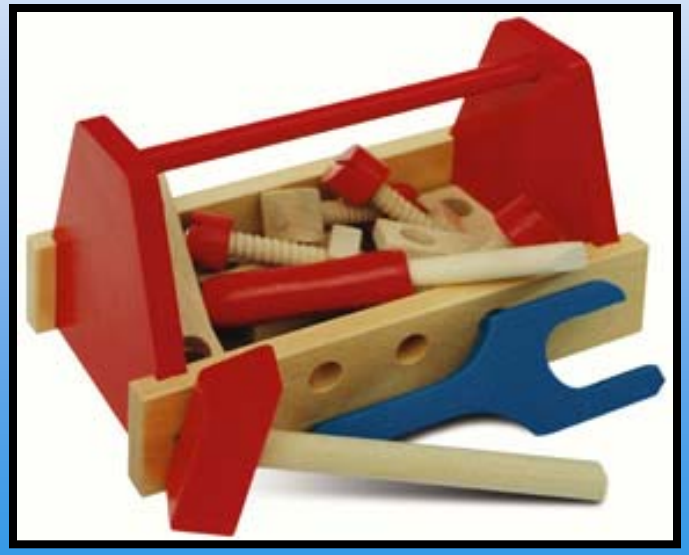


Installation

Kelly Davis

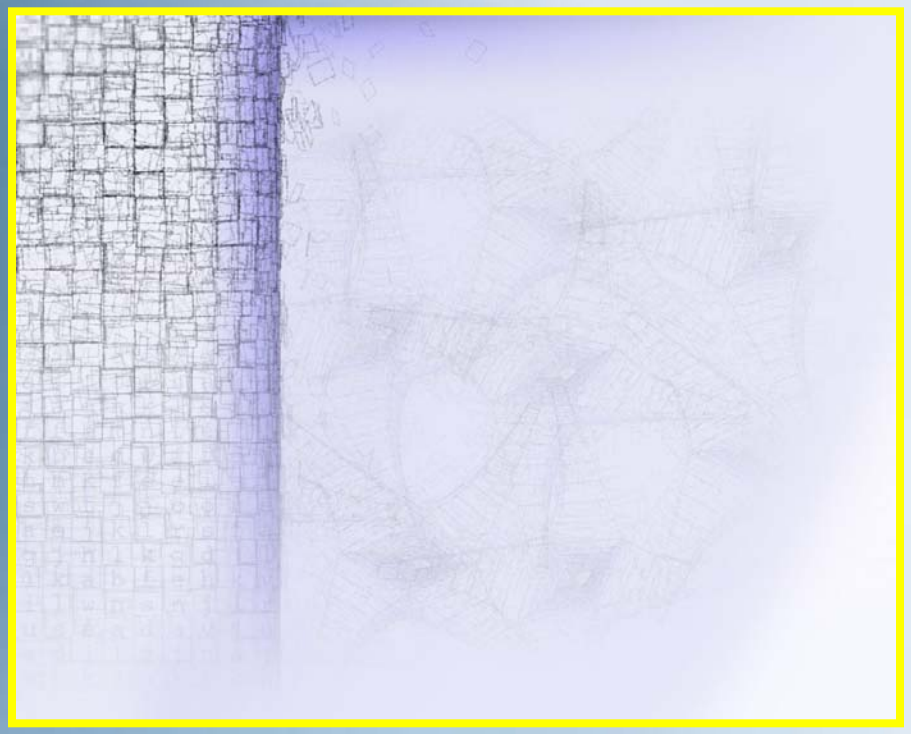
Kdavis@aei.mpg.de

MPI-AEI



Installation: Outline

- Download, configure. make, make install
- Set Environment
- Test



Installation

- Download, configure, make, make install…

Don't worry about it…

Installation

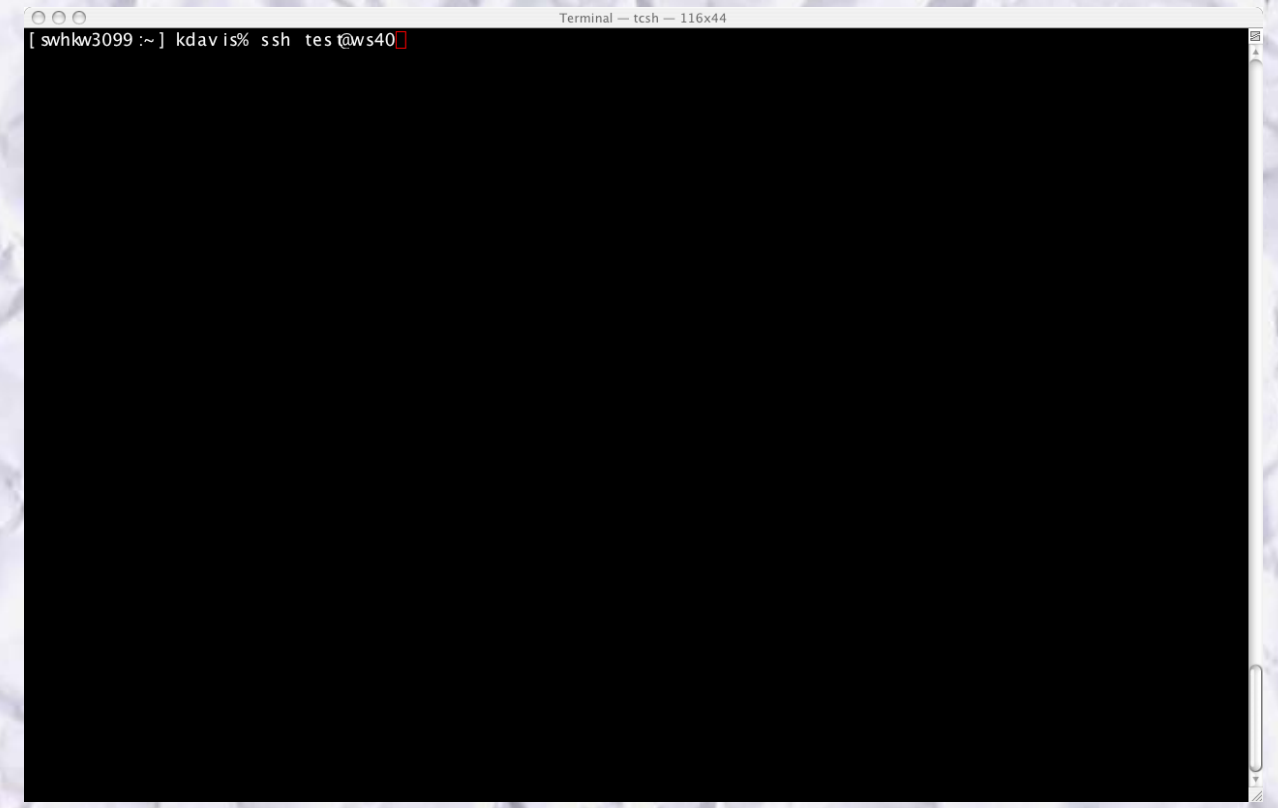
- Download, configure, make, make install…

ssh <user>@ws<0-40>

Installation

- Download, configure, make, make install…

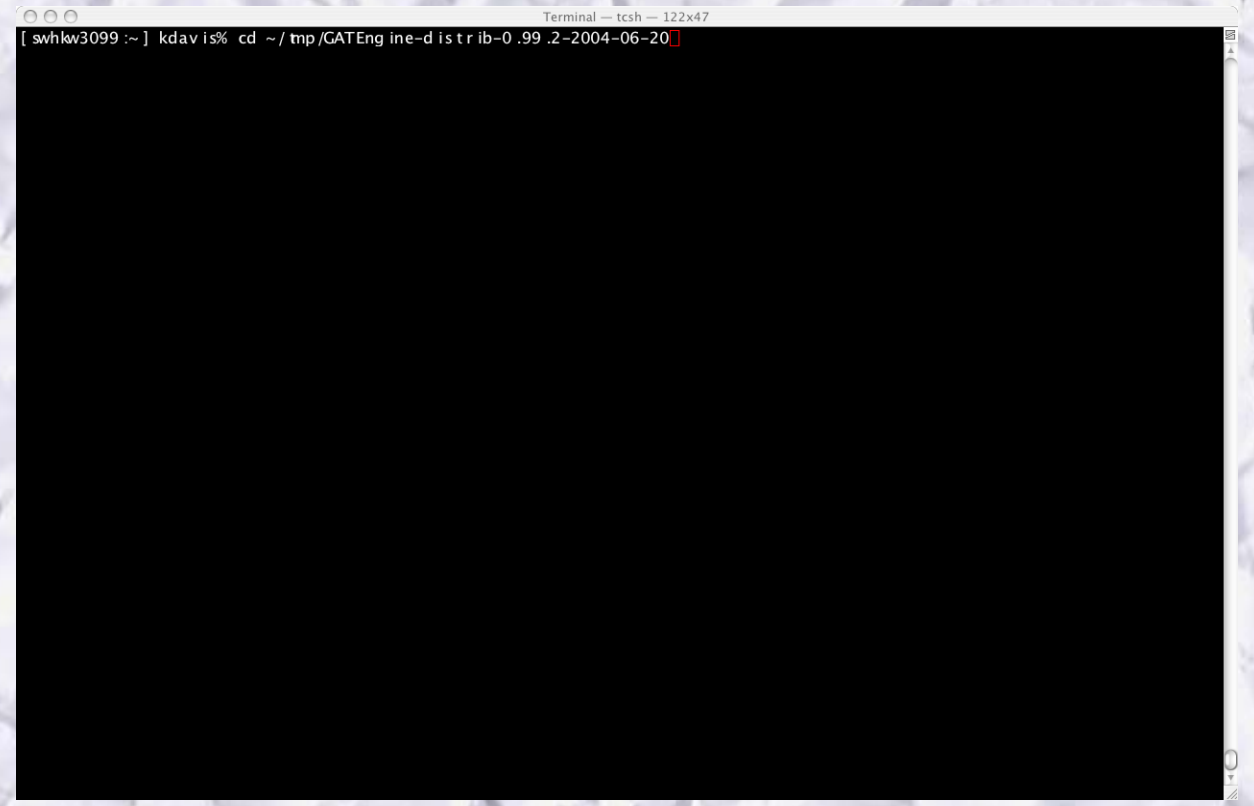
ssh <user>@ws<0-40>



Installation

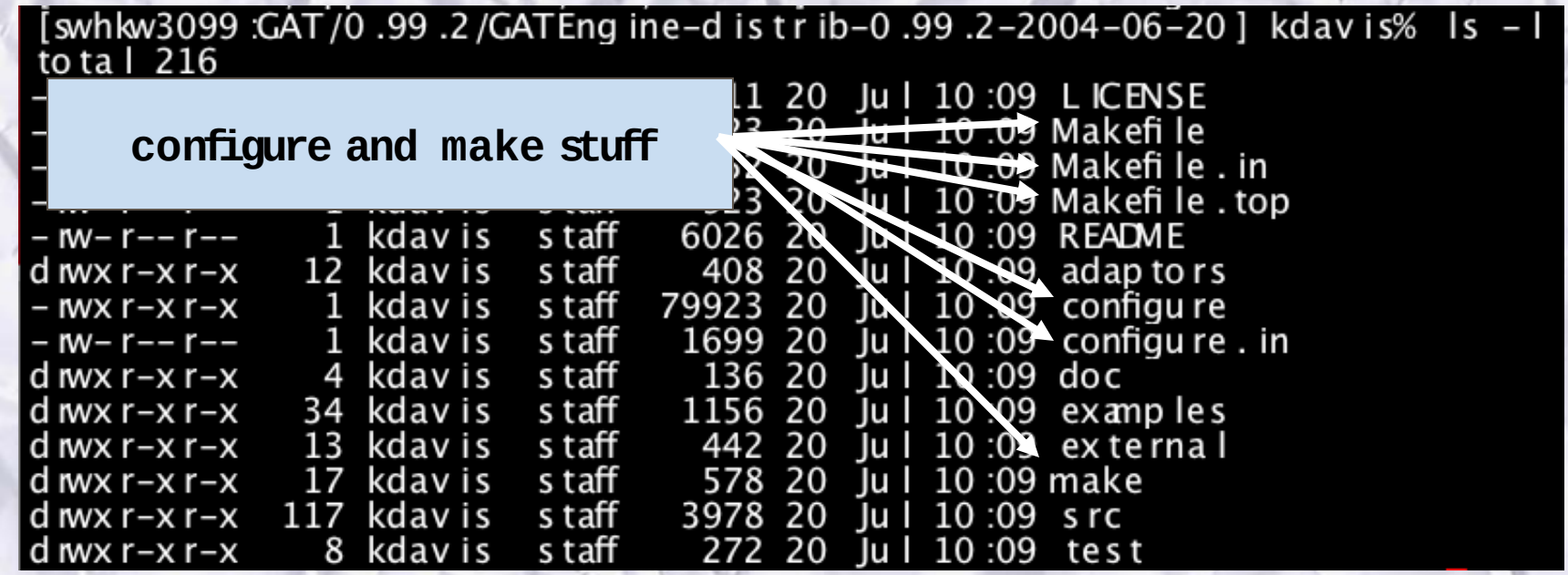
- Download, configure, make, make install…

```
cd ~/tmp/GATEngine-distrib-0.99.2-2004-06-20
```



Installation

- Download, configure, make, make install…
  - ls -l



Installation

- Download, configure, make, make install…
  - ls -l

```
[swhkw3099:GAT/0.99.2/GATEngine-distrib-0.99.2-2004-06-20] kdavis% ls -l
total 216
-rw-r--r--     1 kdavis  staff    3311 20 Jul 10:09 LICENSE
-rw-r--r--     1 kdavis  staff     923 20 Jul 10:09 Makefile
-rw-r--r--     1 kdavis  staff    3552 20 Jul 10:09 Makefile.in
-rw-r--r--     1 kdavis  staff     923 20 Jul 10:09 Makefile.top
-rw-r--r--     1 kdavis  staff    6026 20 Jul 10:09 README
drwxr-xr-x    12 kdavis  staff     408 20 Jul 10:09 adaptors
-rwxr-xr-x     1 kdavis  staff   79923 20 Jul 10:09 configure
-                                      Jul 10:09 configure.in
d                                     Jul 10:09 doc
d                                     Jul 10:09 examples
drwxr-xr-x    15 kdavis  staff     442 20 Jul 10:09 external
drwxr-xr-x    17 kdavis  staff     578 20 Jul 10:09 make
drwxr-xr-x   117 kdavis  staff    3978 20 Jul 10:09 src
drwxr-xr-x     8 kdavis  staff     272 20 Jul 10:09 test
```

LICENSE and README

Installation

- Download, configure, make, make install…
  - ls -l

```
[swhkw3099:GAT/0.99.2/GATEngine-distrib-0.99.2-2004-06-20] kdavis% ls -l
total 216
-rw-r--r--    1 kdavis  staff   3311 20 Jul 10:09 LICENSE
-rw-r--r--    1 kdavis  staff    923 20 Jul 10:09 Makefile
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-rw-r--r--    1 kdavis  staff   1026 20 Jul 10:09 README
drwxr-xr-x    3 kdavis  staff     98 20 Jul 10:09 adaptors
-rwxr-xr-x    1 kdavis  staff    923 20 Jul 10:09 configure
-rw-r--r--    1 kdavis  staff   1699 20 Jul 10:09 configure.in
drwxr-xr-x    4 kdavis  staff    136 20 Jul 10:09 doc
drwxr-xr-x   34 kdavis  staff   1156 20 Jul 10:09 examples
drwxr-xr-x   13 kdavis  staff    442 20 Jul 10:09 external
drwxr-xr-x   17 kdavis  staff    578 20 Jul 10:09 make
drwxr-xr-x  117 kdavis  staff   3978 20 Jul 10:09 src
drwxr-xr-x    8 kdavis  staff    272 20 Jul 10:09 test
```
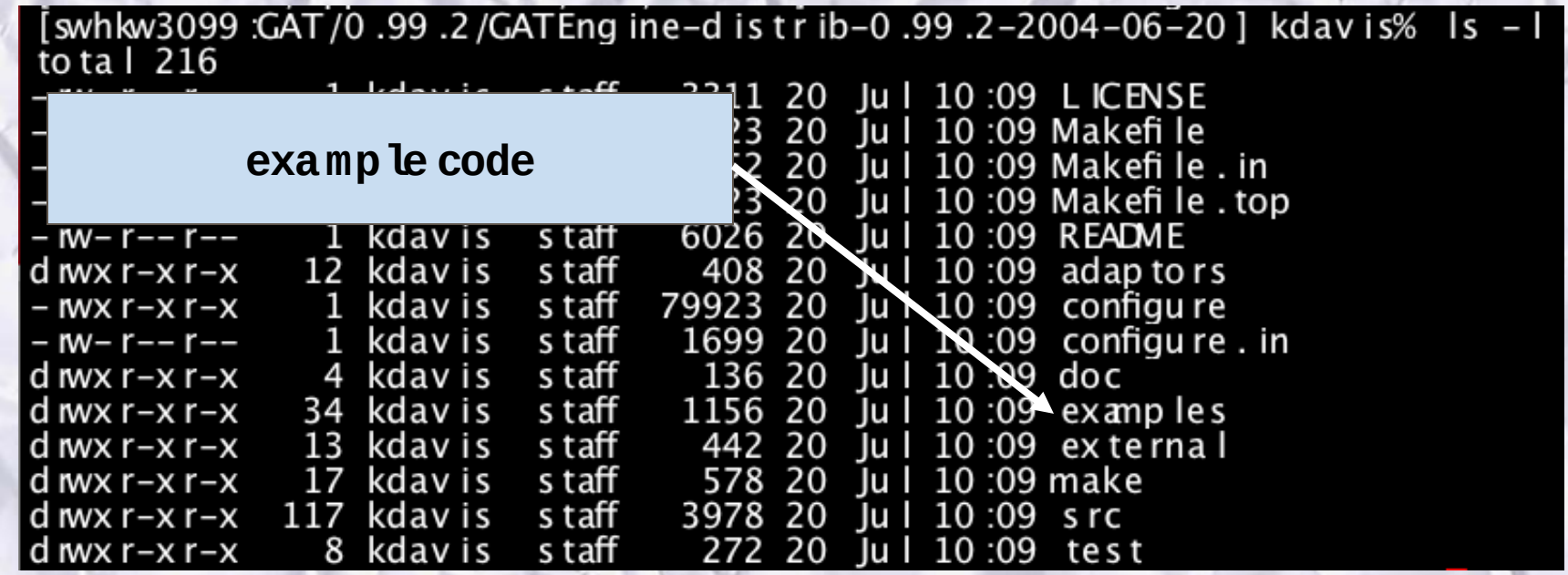

Default adaptors

Installation

- Download, configure, make, make install…
  - ls -l



Installation

- Download, configure, make, make install…
  - ls -l

```
[swhkw3099:GAT/0.99.2/GATEngine-distrib-0.99.2-2004-06-20] kdavis% ls -l
total 216
-rw-r--r--     1 kdavis   staff    3311 20 Jul 10:09 LICENSE
-rw-r--r--     1 kdavis   staff     923 20 Jul 10:09 Makefile
-rw-r--r--     1 kdavis   staff    3552 20 Jul 10:09 Makefile.in
-rw-r--r--     1 kdavis   staff     923 20 Jul 10:09 Makefile.top
-rw-r--r--     1 kdavis   staff    6026 20 Jul 10:09 README
d                                  408 20 Jul 10:09 adaptors
-                                   23 20 Jul 10:09 configure
-                                   09 20 Jul 10:09 configure.in
d                                   36 20 Jul 10:09 doc
drwxr-xr-x    34 kdavis   staff    1156 20 Jul 10:09 examples
drwxr-xr-x    13 kdavis   staff     442 20 Jul 10:09 external
drwxr-xr-x    17 kdavis   staff     578 20 Jul 10:09 make
drwxr-xr-x   117 kdavis   staff    3978 20 Jul 10:09 src
drwxr-xr-x     8 kdavis   staff     272 20 Jul 10:09 test
```

External libraries

Installation

- Download, configure, make, make install…
  - ls -l

```
[swhkw3099:GAT/0.99.2/GATEngine-distrib-0.99.2-2004-06-20] kdavis% ls -l
total 216
-rw-r--r--     1 kdavis   staff    3311 20 Jul 10:09 LICENSE
-rw-r--r--     1 kdavis   staff     923 20 Jul 10:09 Makefile
-rw-r--r--     1 kdavis   staff    3552 20 Jul 10:09 Makefile.in
-rw-r--r--     1 kdavis   staff     923 20 Jul 10:09 Makefile.top
-rw-r--r--     1 kdavis   staff    6026 20 Jul 10:09 README
drwxr-xr-x    12 kdavis   staff     408 20 Jul 10:09 adaptors
-rwxr-xr-x     1 kdavis   staff      23 20 Jul 10:09 configure
-rw-r--r--     1 kdavis   staff      99 20 Jul 10:09 configure.in
drwxr-xr-x     3 kdavis   staff      36 20 Jul 10:09 doc
drwxr-xr-x    34 kdavis   staff    1156 20 Jul 10:09 examples
drwxr-xr-x    13 kdavis   staff     442 20 Jul 10:09 external
drwxr-xr-x    17 kdavis   staff     578 20 Jul 10:09 make
drwxr-xr-x   117 kdavis   staff    3978 20 Jul 10:09 src
drwxr-xr-x     8 kdavis   staff     272 20 Jul 10:09 test
```

The source Luke

Installation

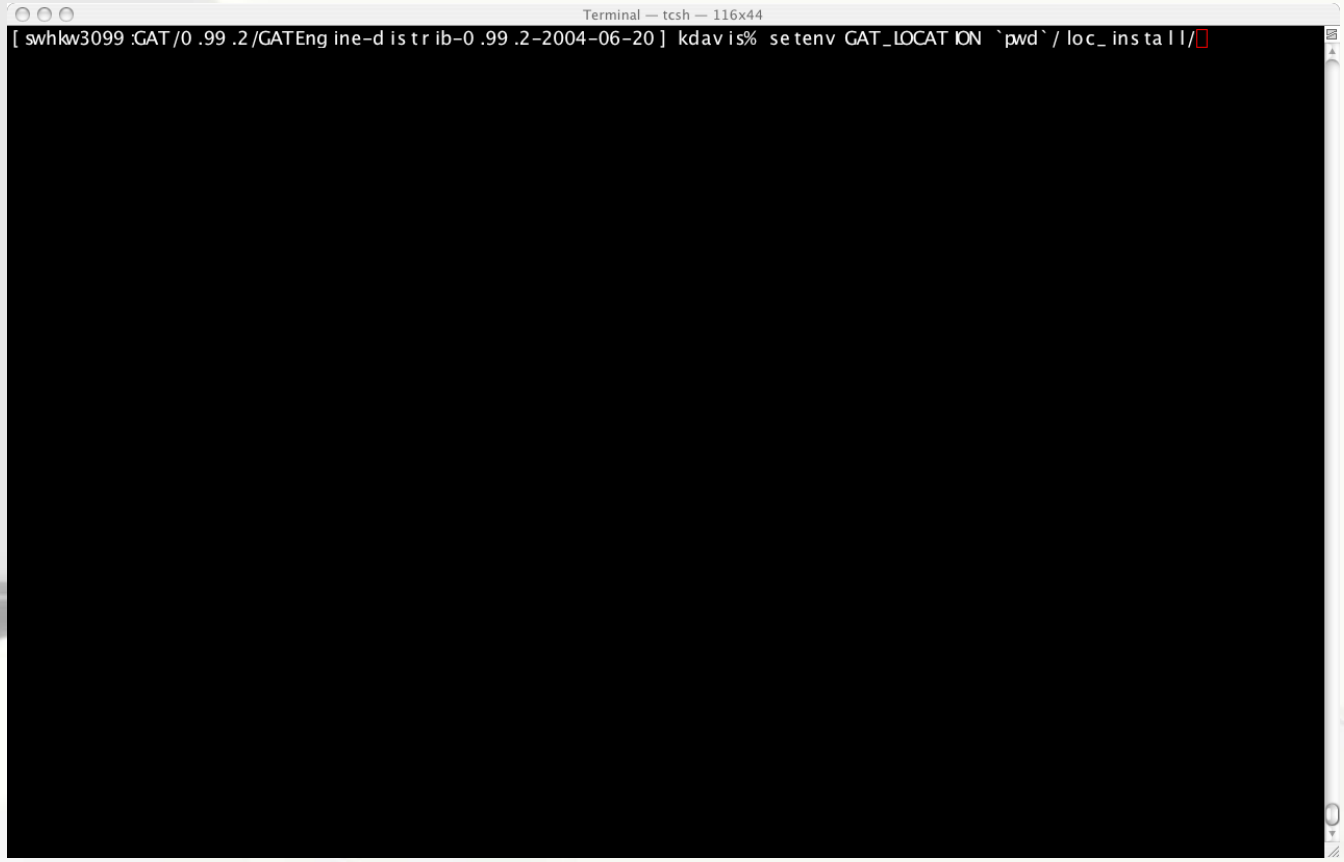
- Download, configure, make, make install…
  - ls -l

```
[swhkw3099:GAT/0.99.2/GATEngine-distrib-0.99.2-2004-06-20] kdavis% ls -l
total 216
-rw-r--r--    1 kdavis  staff   3311 20 Jul 10:09 LICENSE
-rw-r--r--    1 kdavis  staff    923 20 Jul 10:09 Makefile
-rw-r--r--    1 kdavis  staff   3552 20 Jul 10:09 Makefile.in
-                                23 20 Jul 10:09 Makefile.top
-                                26 20 Jul 10:09 README
d                                   20 Jul 10:09 adaptors
-                                23 20 Jul 10:09 configure
-rw-r--r--    1 kdavis  staff   1699 20 Jul 10:09 configure.in
drwxr-xr-x    4 kdavis  staff    136 20 Jul 10:09 doc
drwxr-xr-x   34 kdavis  staff   1156 20 Jul 10:09 examples
drwxr-xr-x   13 kdavis  staff    442 20 Jul 10:09 external
drwxr-xr-x   17 kdavis  staff    578 20 Jul 10:09 make
drwxr-xr-x  117 kdavis  staff   3978 20 Jul 10:09 src
drwxr-xr-x    8 kdavis  staff    272 20 Jul 10:09 test
```

Unit tests

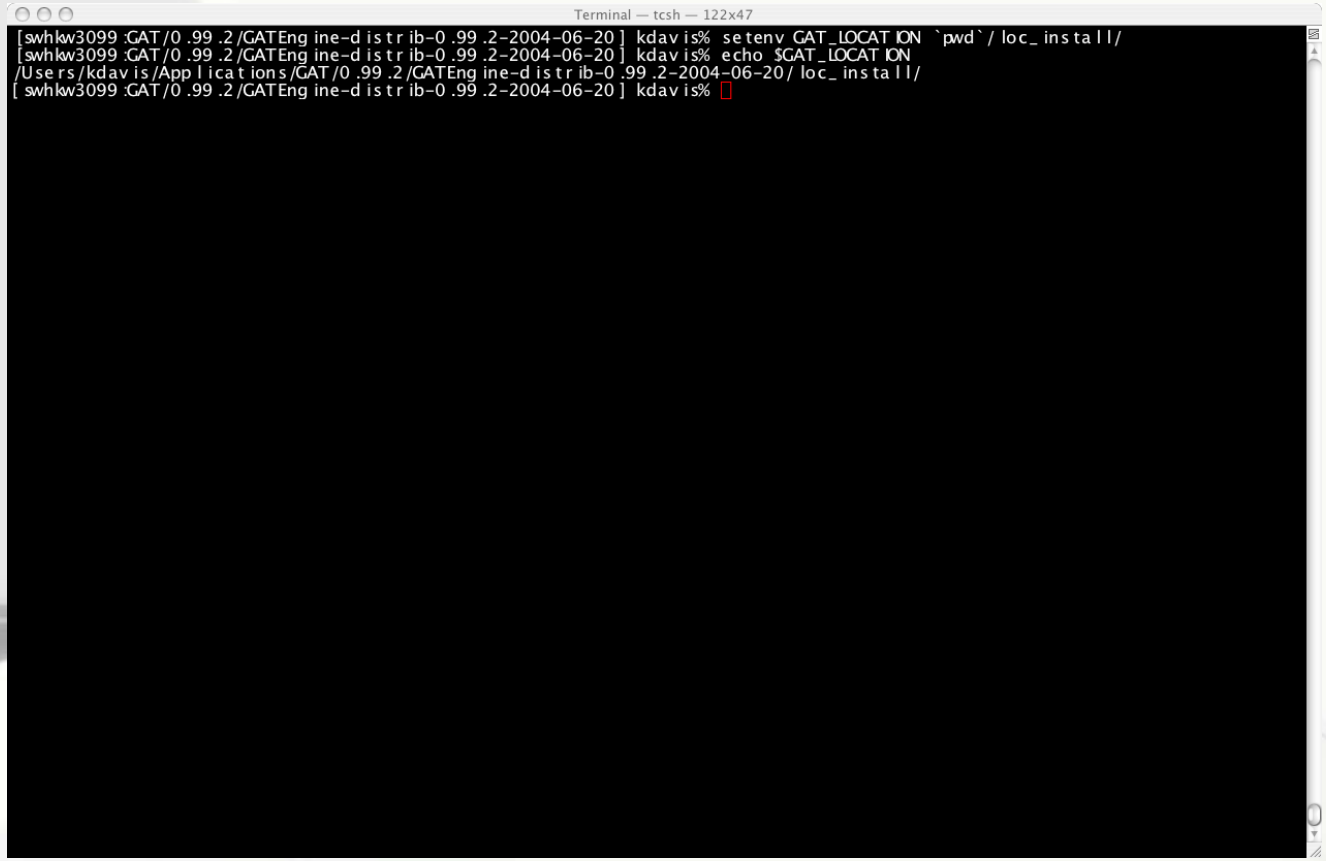
Installation

- Set Environment
  - setenv GAT_LOCATION `pwd`/loc_install/



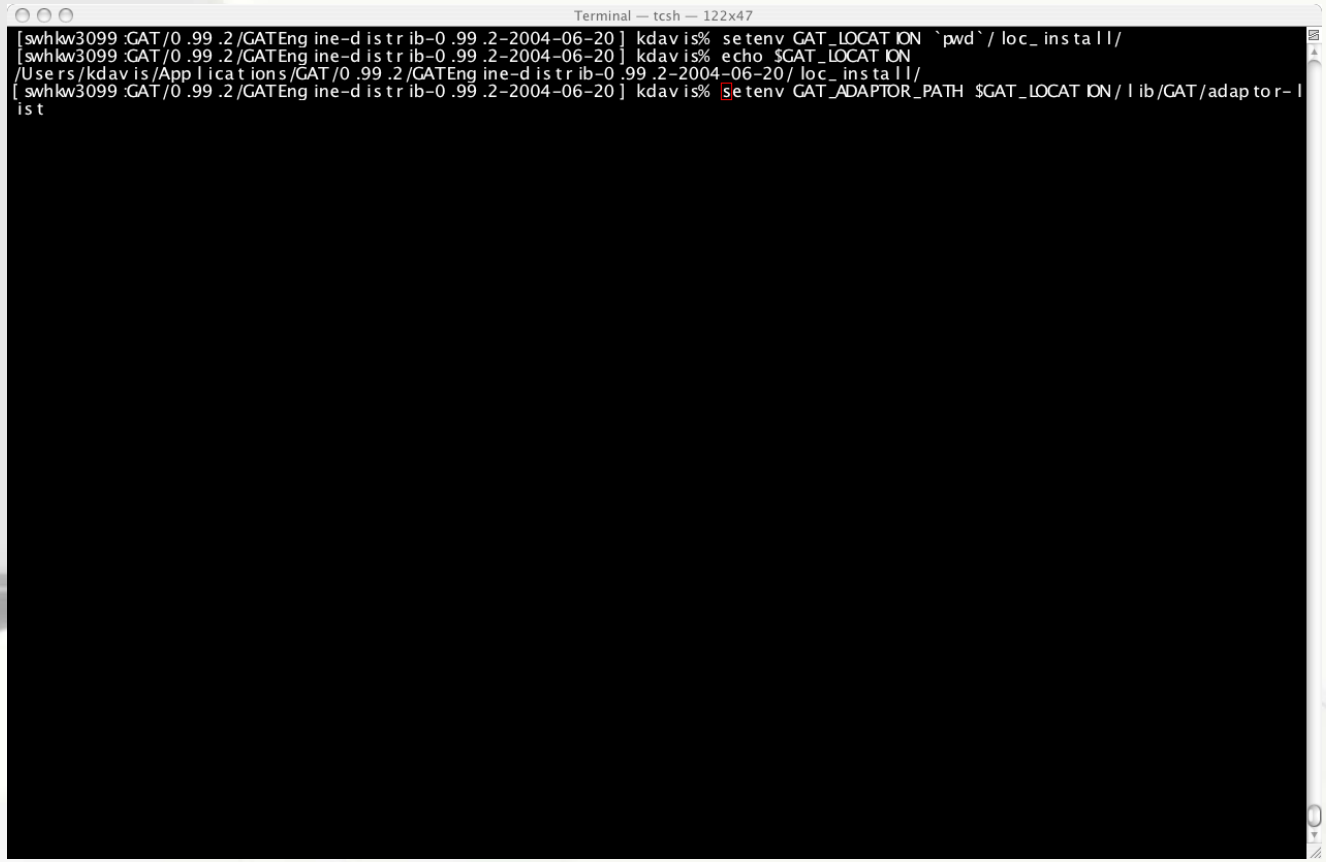
Installation

- Set Environment
  - echo $GAT_LOCATION



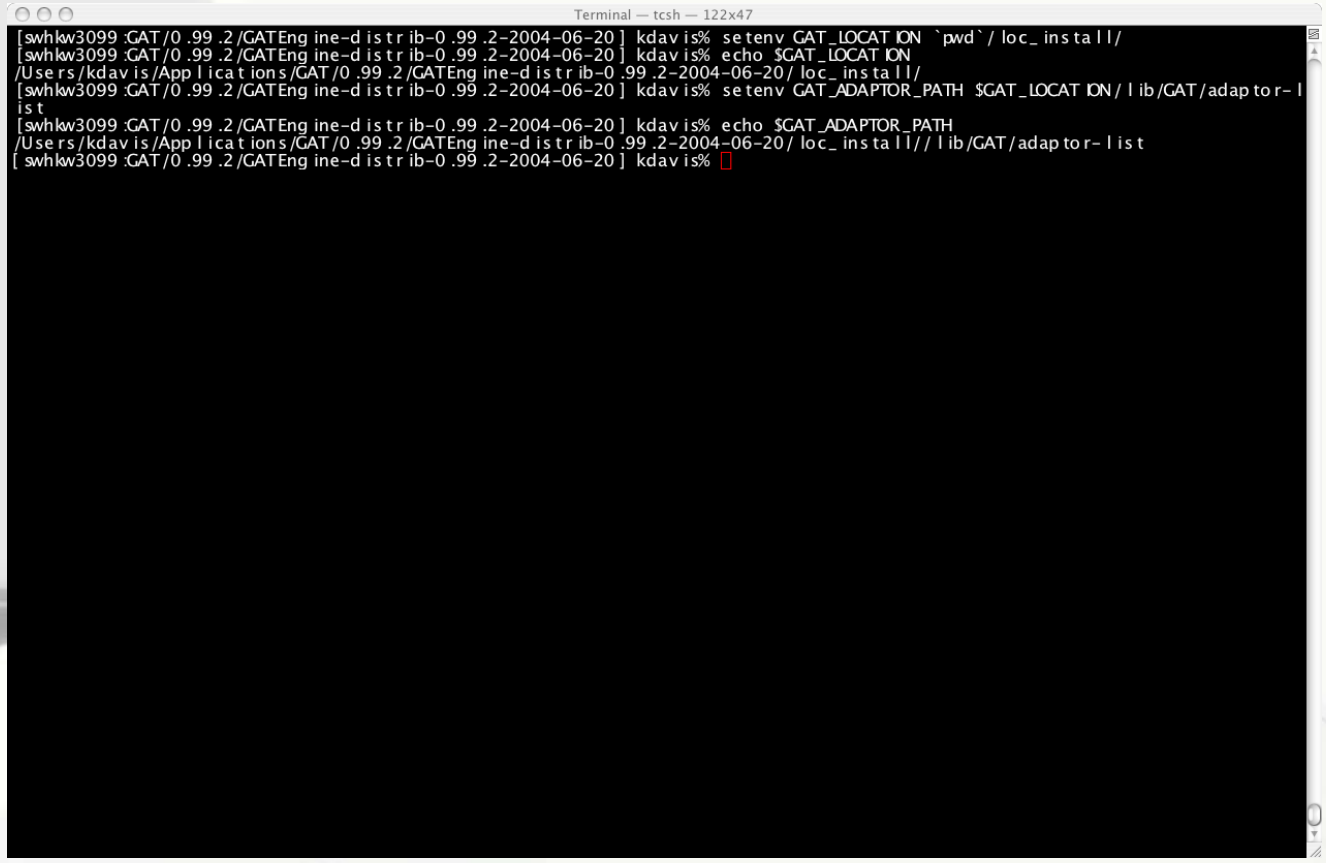
Installation

- Set Environment
  - setenv GAT_ADAPTOR_PATH $GAT_LOCATION/lib/GAT/adaptor-list



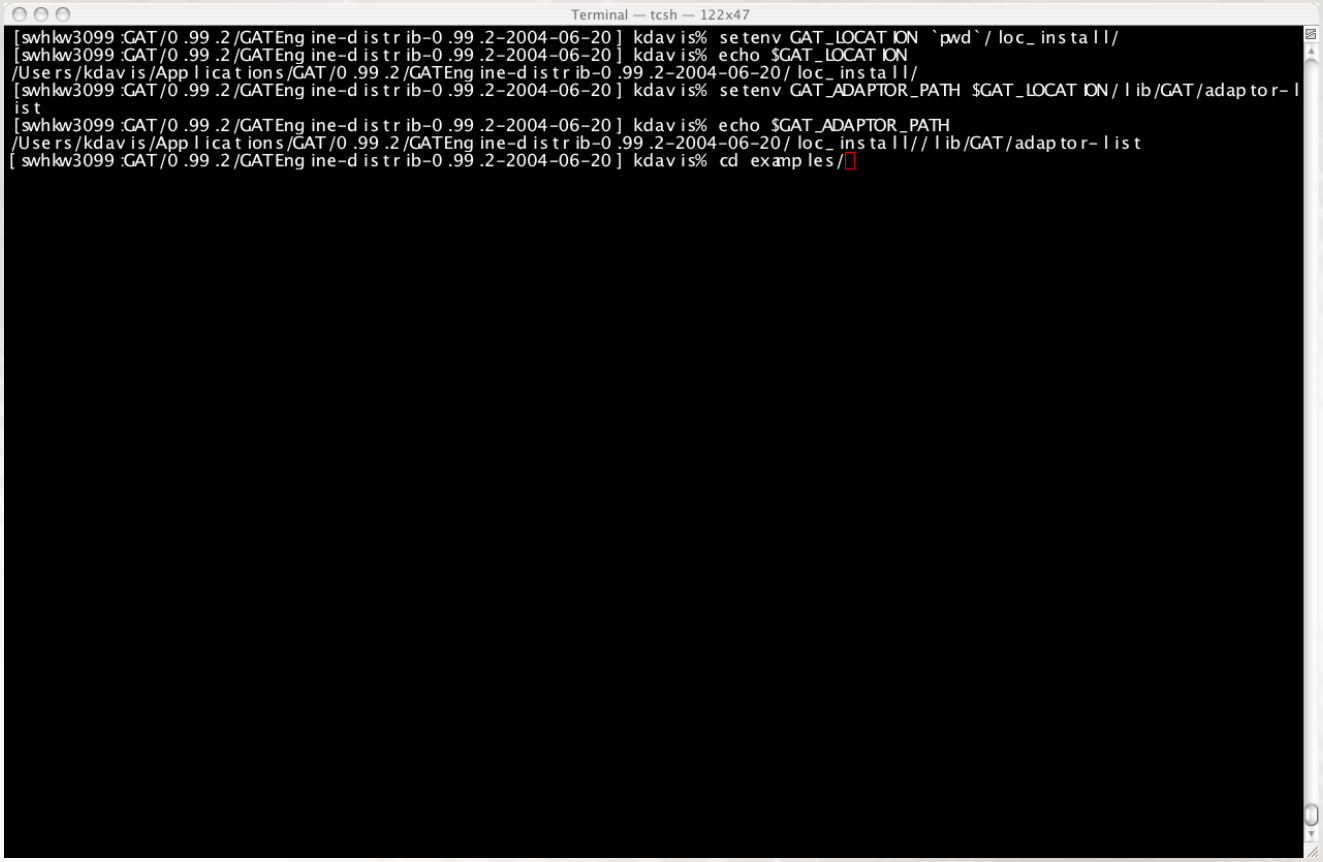
Installation

- Set Environment
  - echo $GAT_ADAPTOR_PATH



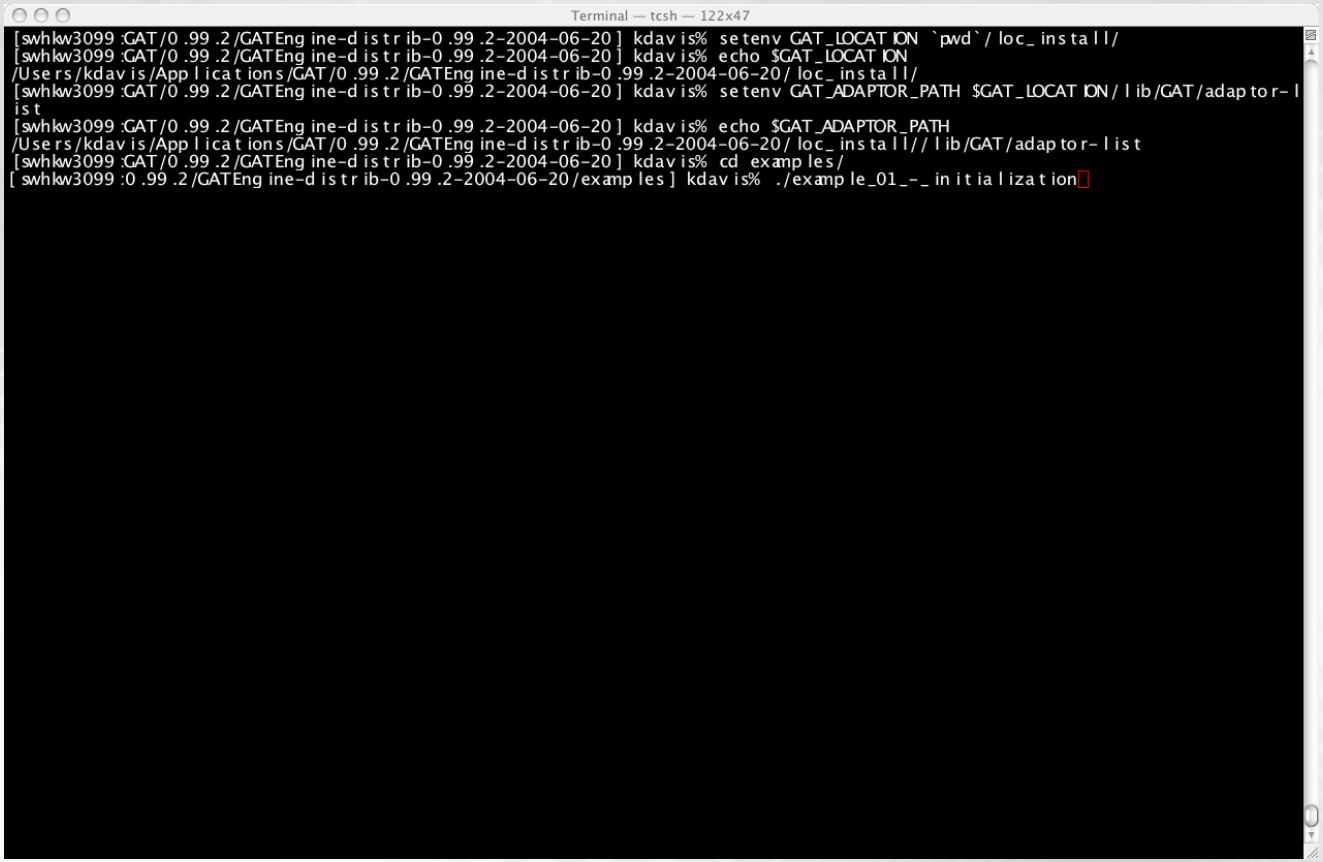
Installation

- Test
  - cd examples



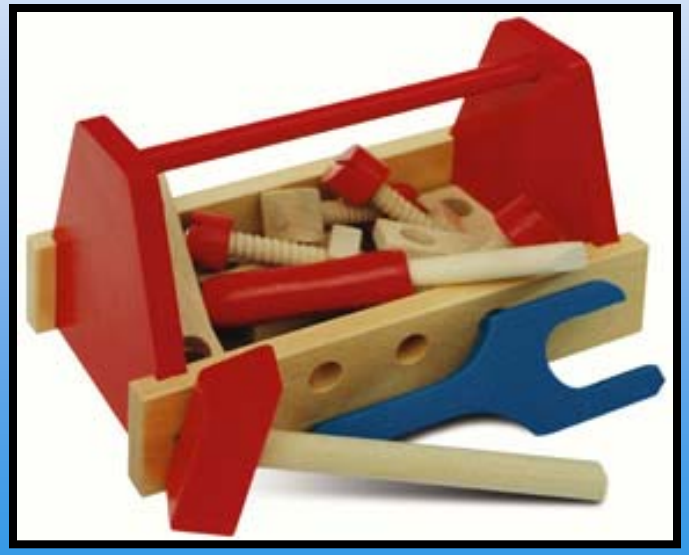
Installation

- Test
  - ./example_01_-_initialization



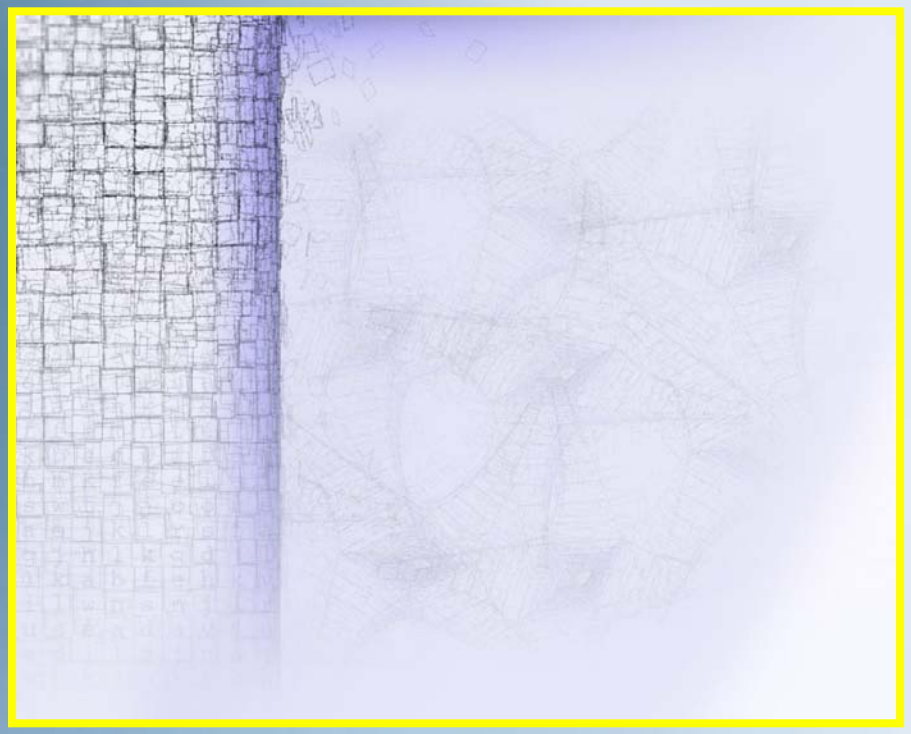
Hello Cruel World

Kelly Davis
kdavis@aei.mpg.de
MPI-AEI



Hello Cruel World: Outline

- Code
- Run



Hello Cruel World

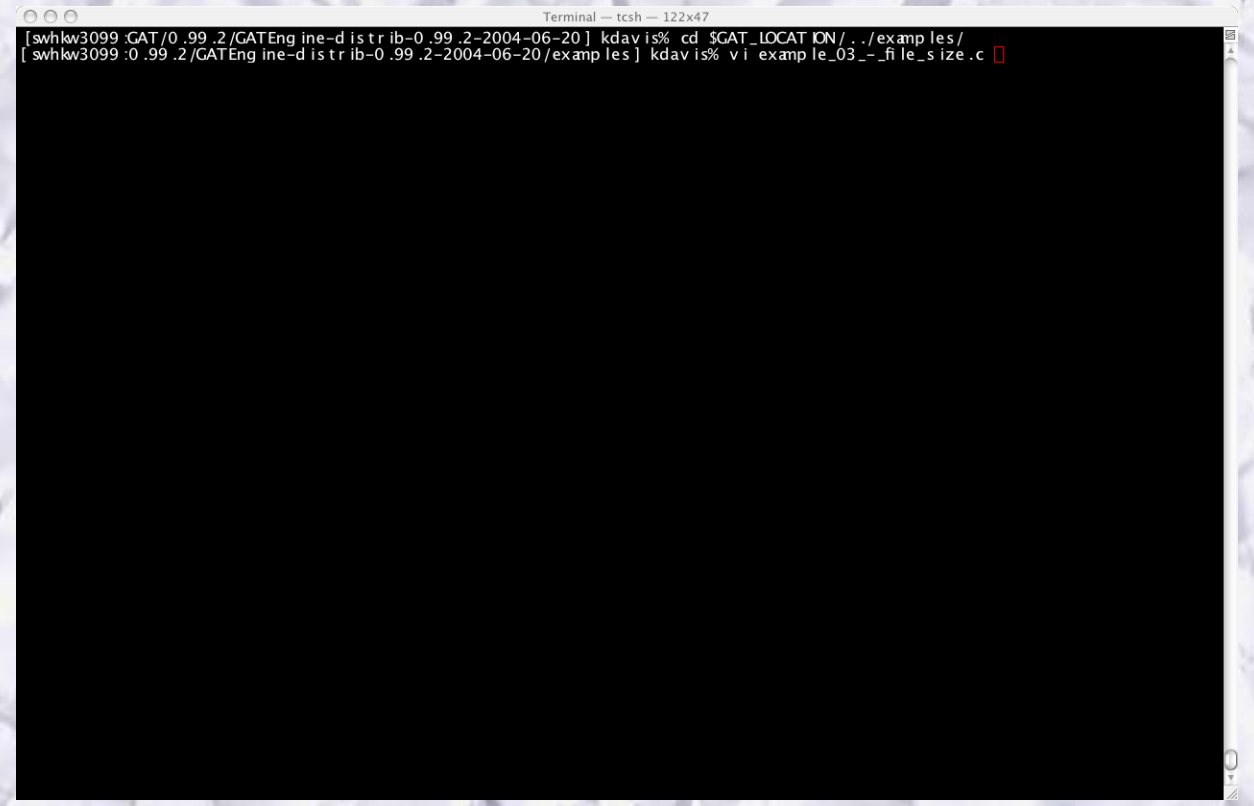
- Code

```
cd $GAT_LOCATION/../examples
```

Hello Cruel World

- Code

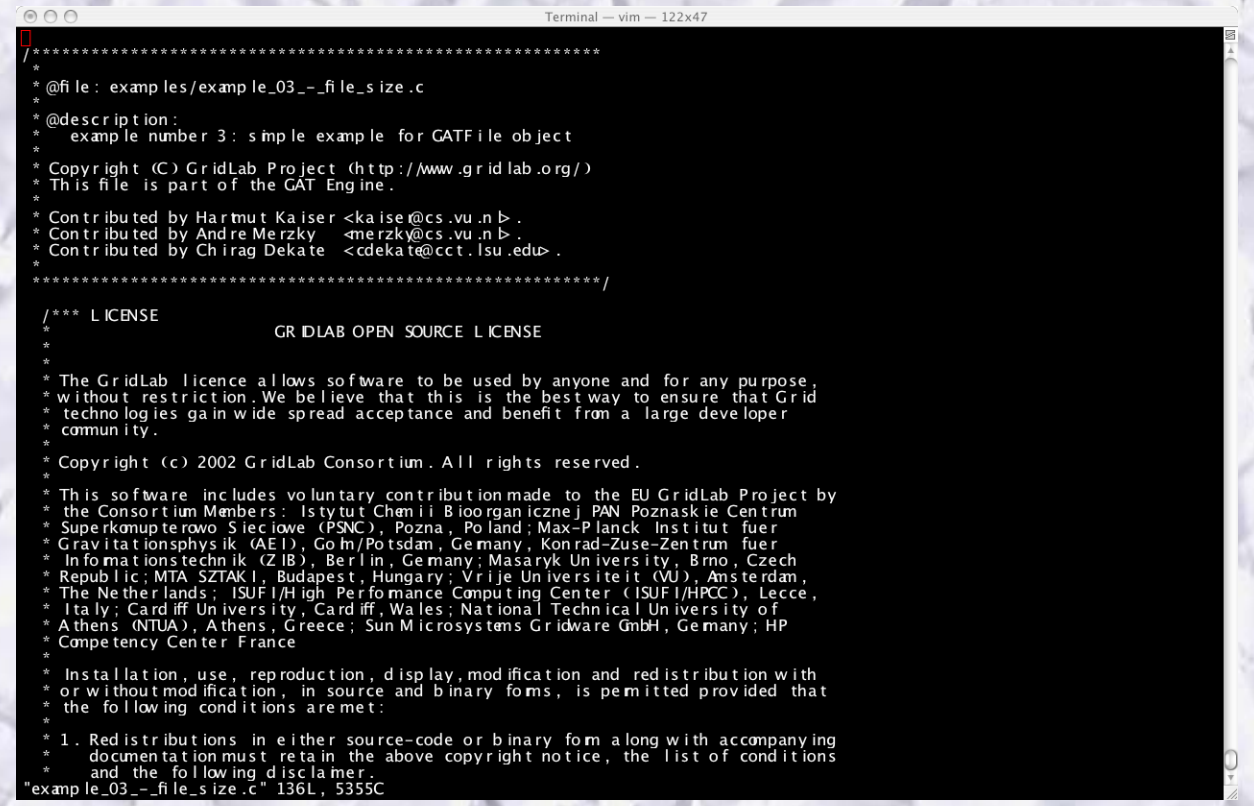
```
vi example_03_-_file_size.c
```



Hello Cruel World

- Code

vi example_03_-_file_size.c



Hello Cruel World

- Code

vi example_03_-_file_size.c

Terminal — vim — 122x47

```
/*************************************************************
 *
 * @file: examples/example_03_-_file_size.c
 *
 * @description:
 *   example number 3: simple example for GATFile object
 *
 * Copyright (C) GridLab Project (http://www.gridlab.org/)
 * This file is part of the GAT Engine.
 *
 * Contributed by Hartmut Kaiser <kaiser@cs.vu.nl>.
 * Contributed by Andre Merzky   <merzky@cs.vu.nl>.
 * Contributed by Chirag Dekate  <cdekate@cct.lsu.edu>.
 *
 *************************************************************/

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 *
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 * without restriction. We bel
 * technologies gain wide sprea
 * community.
 *
 * Copyright (c) 2002 GridLab C
 *
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 * Superkomputerowo Sieciowe (PSNC), Pozna, Poland; Max-Planck Institut fuer
 * Gravitationsphysik (AEI), Golm/Potsdam, Germany, Konrad-Zuse-Zentrum fuer
 * Informationstechnik (ZIB), Berlin, Germany; Masaryk University, Brno, Czech
 * Republic; MTA SZTAKI, Budapest, Hungary; Vrije Universiteit (VU), Amsterdam,
 * The Netherlands; ISUFI/High Performance Computing Center (ISUFI/HPCC), Lecce,
 * Italy; Cardiff University, Cardiff, Wales; National Technical University of
 * Athens (NTUA), Athens, Greece; Sun Microsystems Gridware GmbH, Germany; HP
 * Competency Center France
 *
 * Installation, use, reproduction, display, modification and redistribution with
 * or without modification, in source and binary forms, is permitted provided that
 * the following conditions are met:
 *
 * 1. Redistributions in either source-code or binary form along with accompanying
 *    documentation must retain the above copyright notice, the list of conditions
 *    and the following disclaimer.
"example_03_-_file_size.c" 136L, 5355C
```
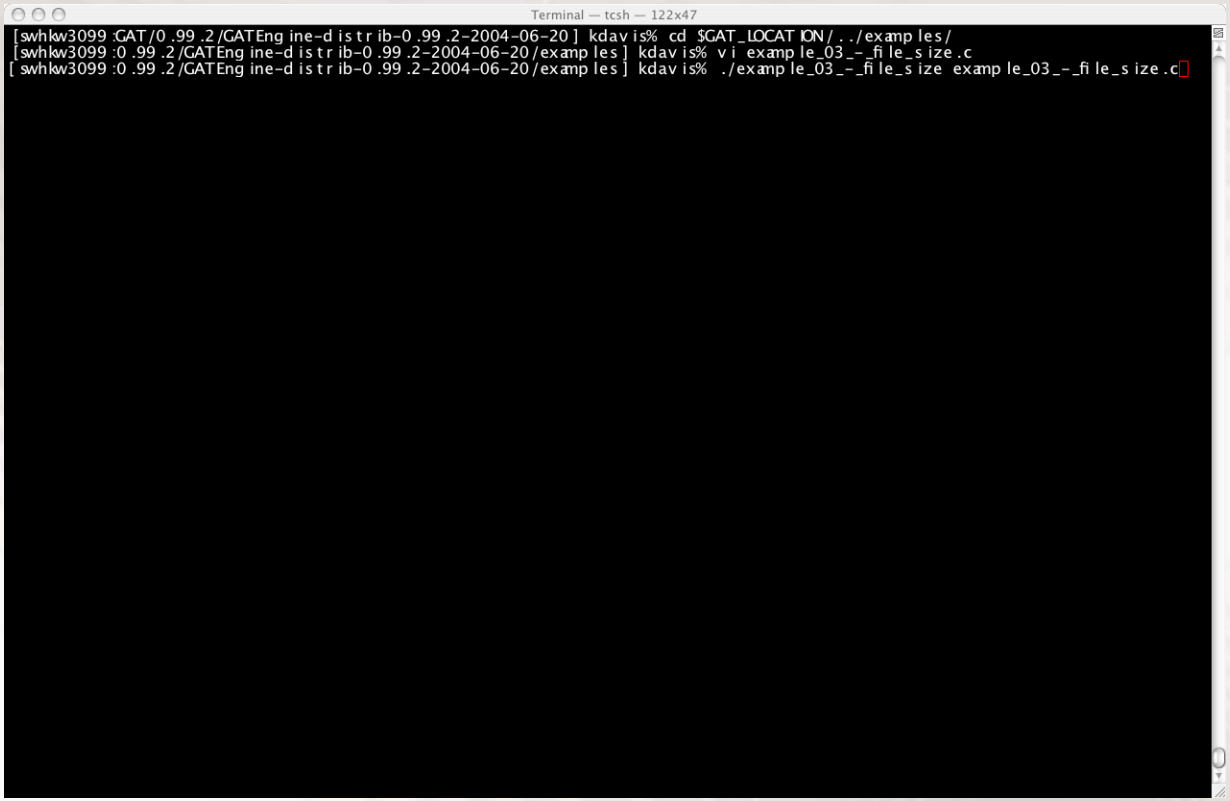

Examine the code

Hello Cruel World

- Run

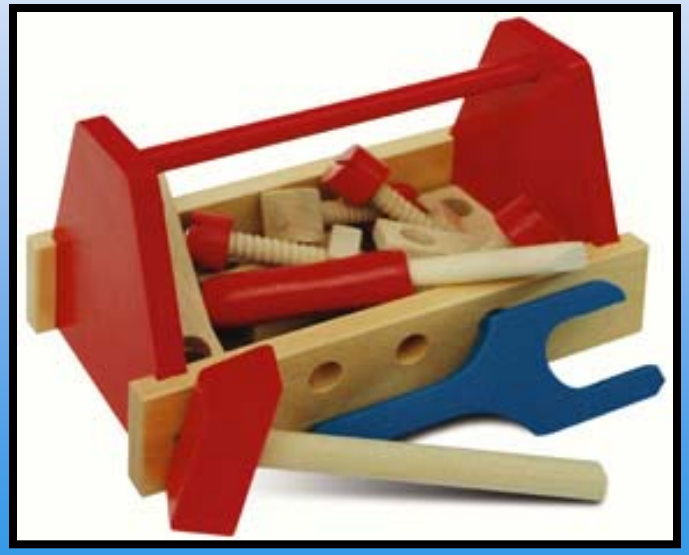
```
./example_03_-_file_size example_03_-_file_size.c
```



File Management

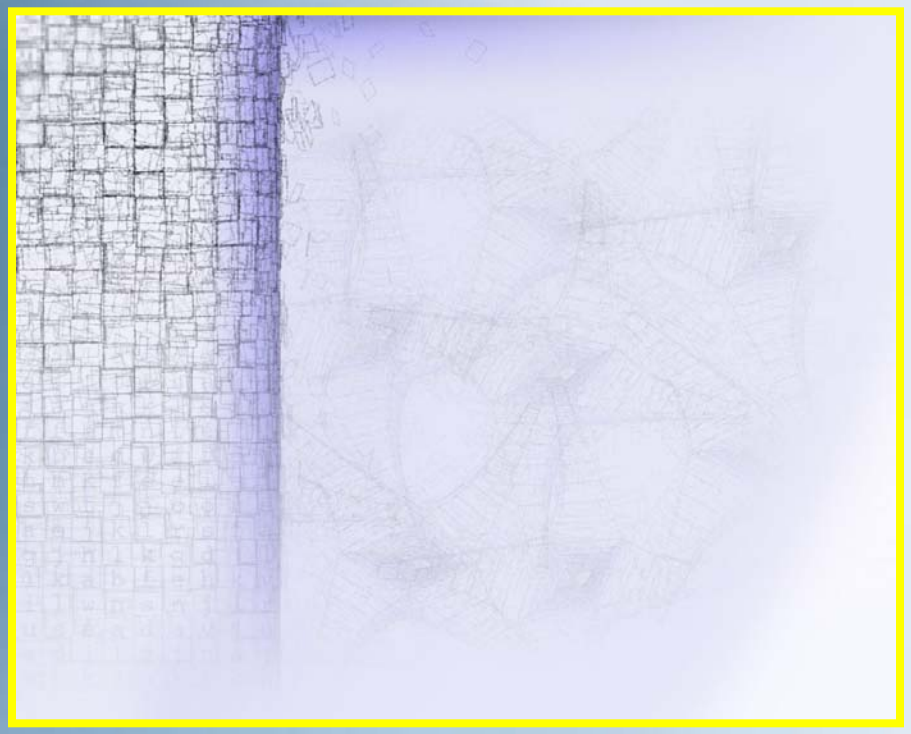
Kelly Davis
kdavis@aei.mpg.de

MPI-AEI



File Management: Outline

- File Package
  - Overview
  - The GATFile class
- Code
  - Example
  - Exercise



File Management

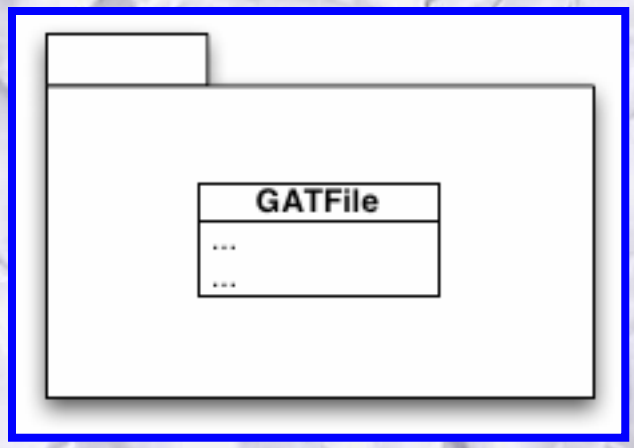
- File Package
  - Overview

The File Package allows application programmers to manipulate Files in a "Grid" environment.

File Management

- File Package
  - Overview

…and contains a single class!

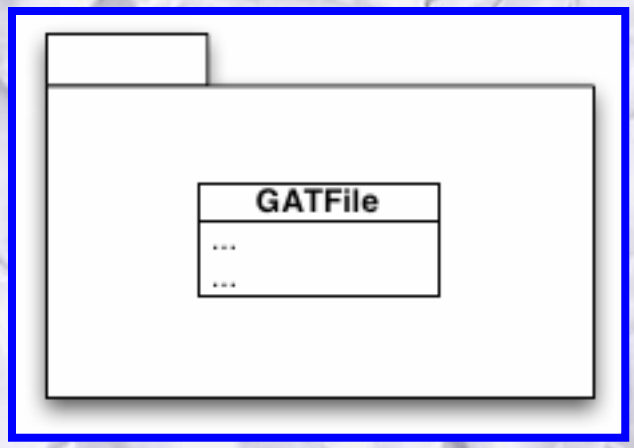


File Management

- File Package
  - Overview

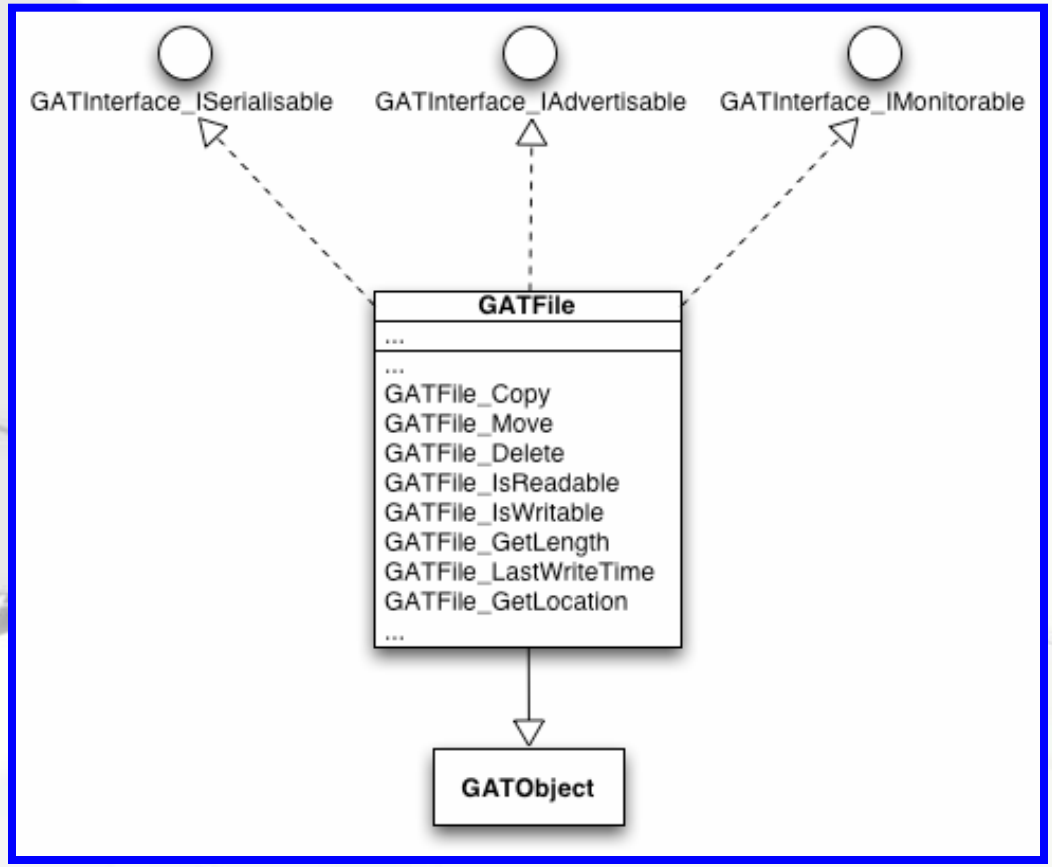
GATFIle allows an application to

- **Copy Files**
- **Move Files**
- **Delete Files**
- **Examine Files**
- **…**



File Management

- File Package
  - The GATFile class copies, moves, deletes…files



File Management

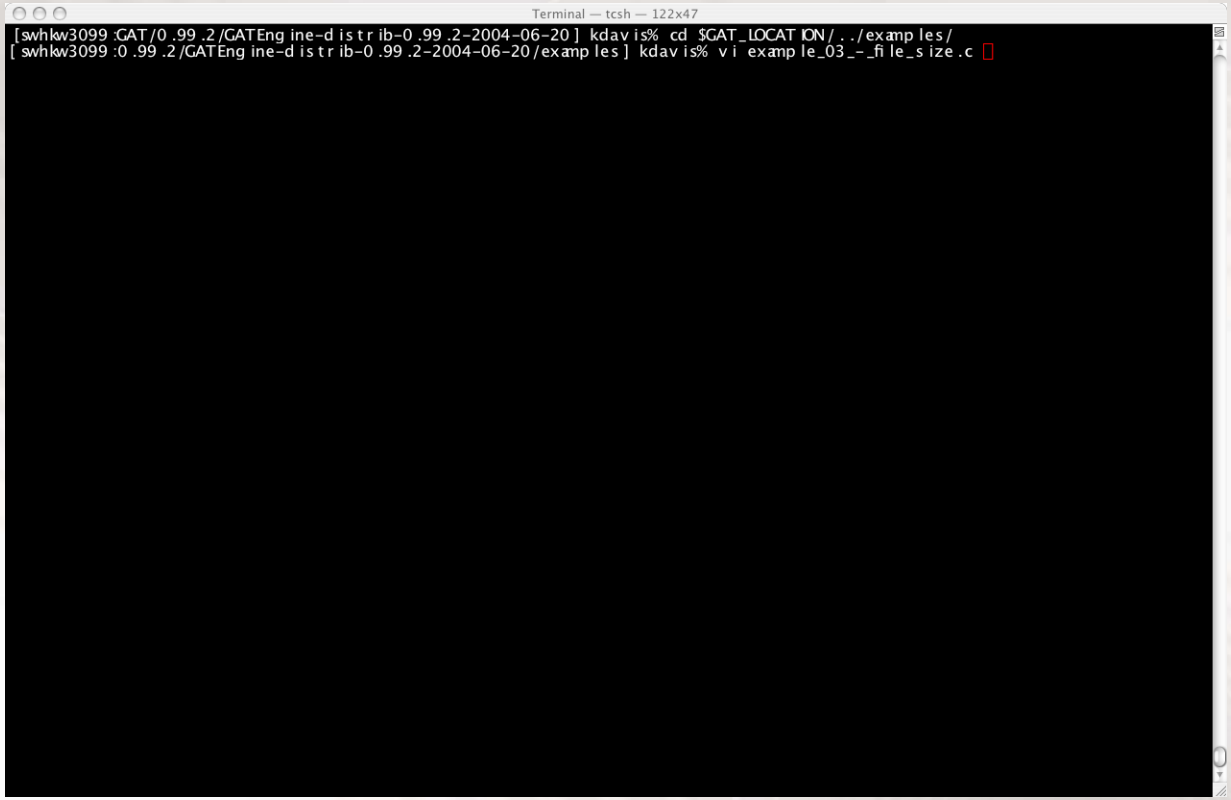
- Code
  - Example

```
cd $GAT_LOCATION/../examples
```

File Management

- Code
  - Example

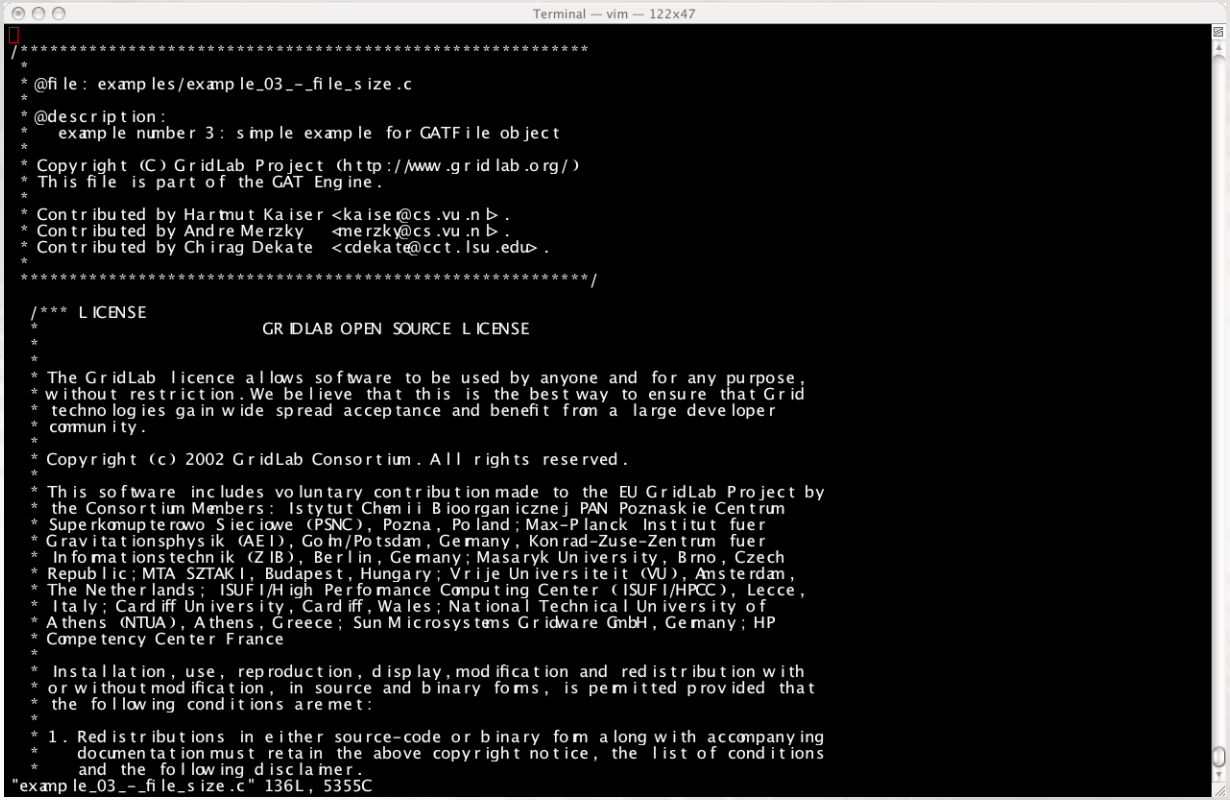
```
vi example_03_-_file_size.c
```



File Management

- Code
  - Example

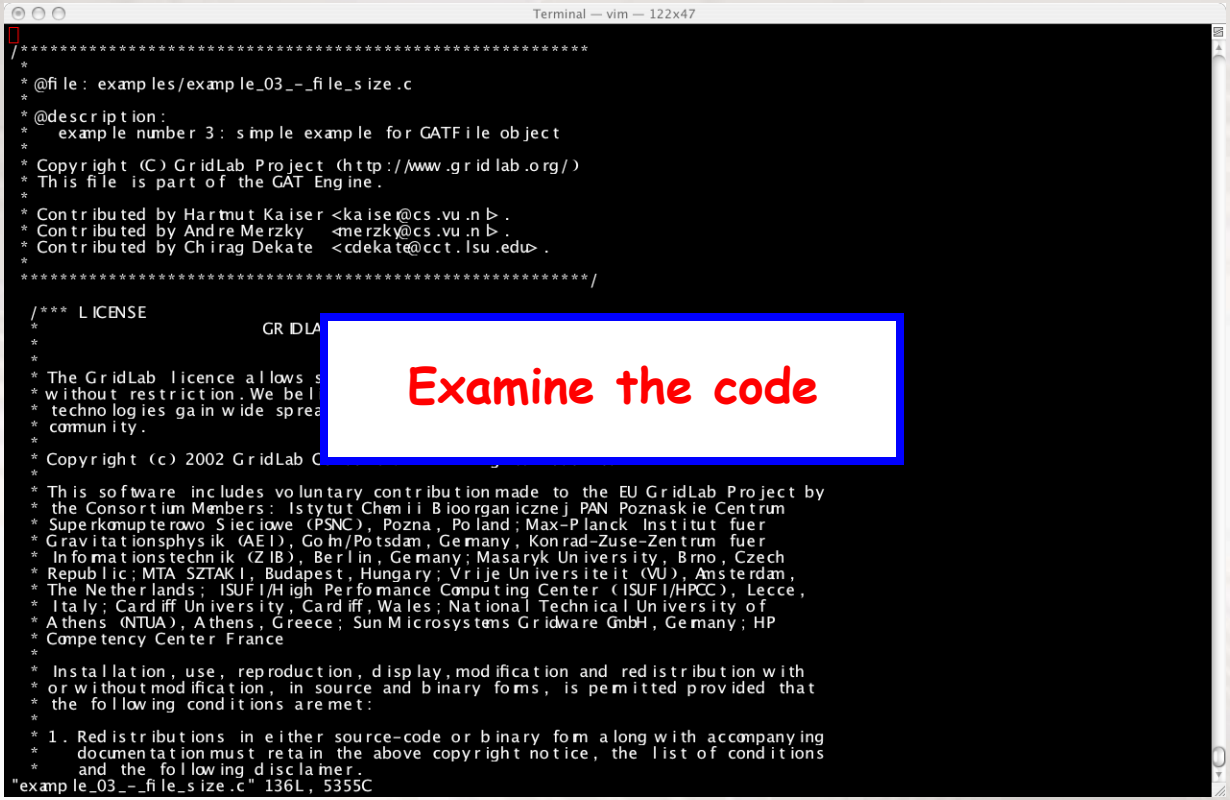
vi example_03_-_file_size.c



File Management

- Code
  - Example

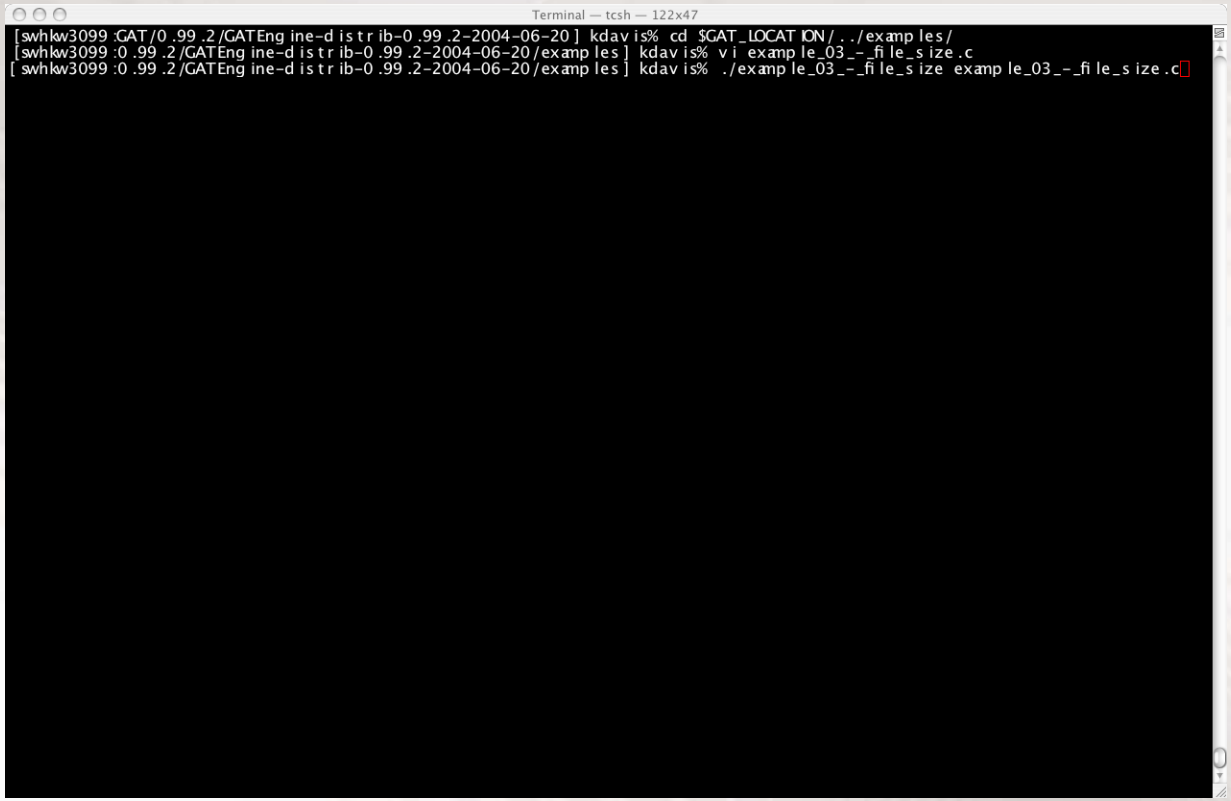
vi example_03_-_file_size.c



File Management

- Code
  - Example

./example_03_-_file_size example_03_-_file_size.c



File Management

- Code
  - Exercise

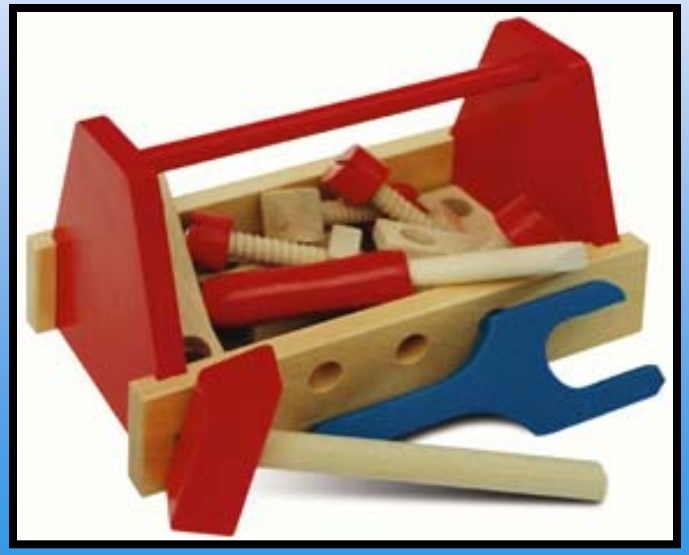
Modify example_03_-_file_size.c to delete a file instead of getting its length.

FileStream Management

Kelly Davis

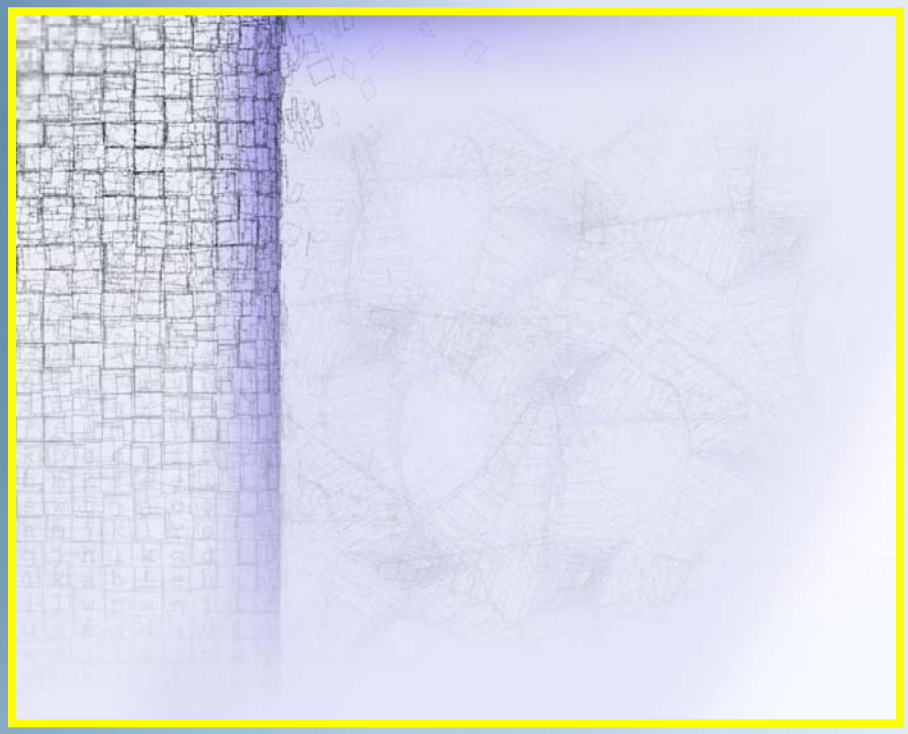
kdavis@aei.mpg.de

MPG-AEI



FileStream Management: Outline

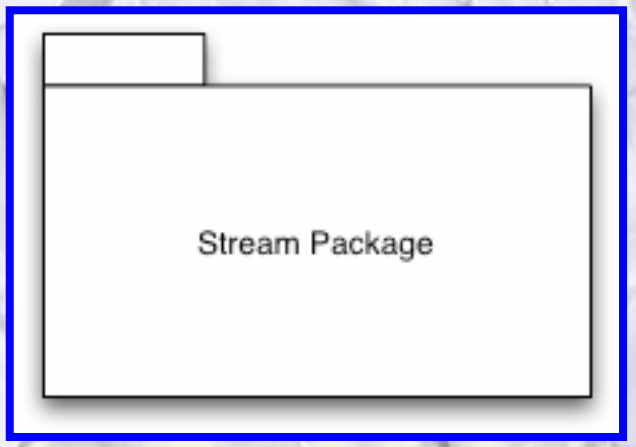
- Stream Package
  - Overview
  - GATFileStream class
- Code
  - Example
  - Exercise



FileStream Management

- Stream Package
  - Overview

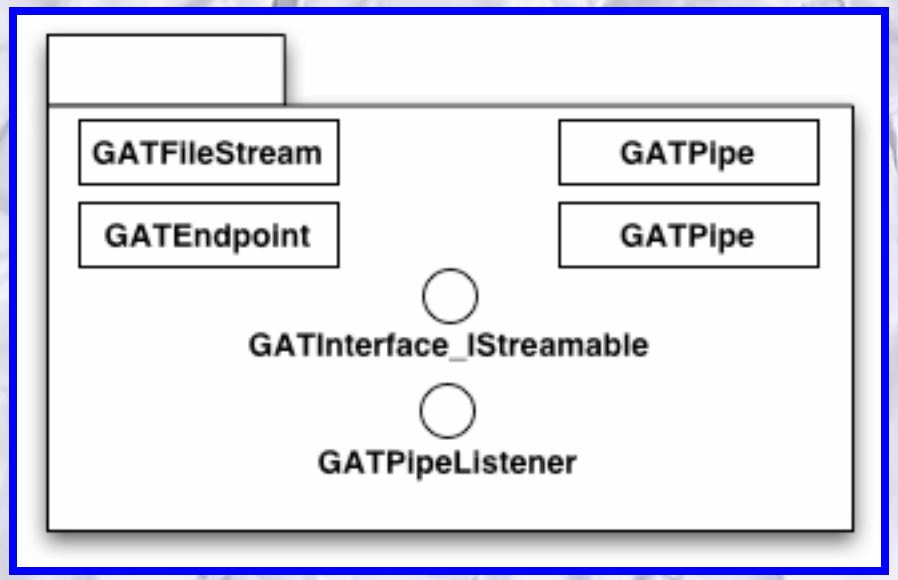
The Stream Package allows application programmers to stream data to and from remote or local processes and to stream data to and from remote or local files.



FileStream Management

- Stream Package
  - Overview

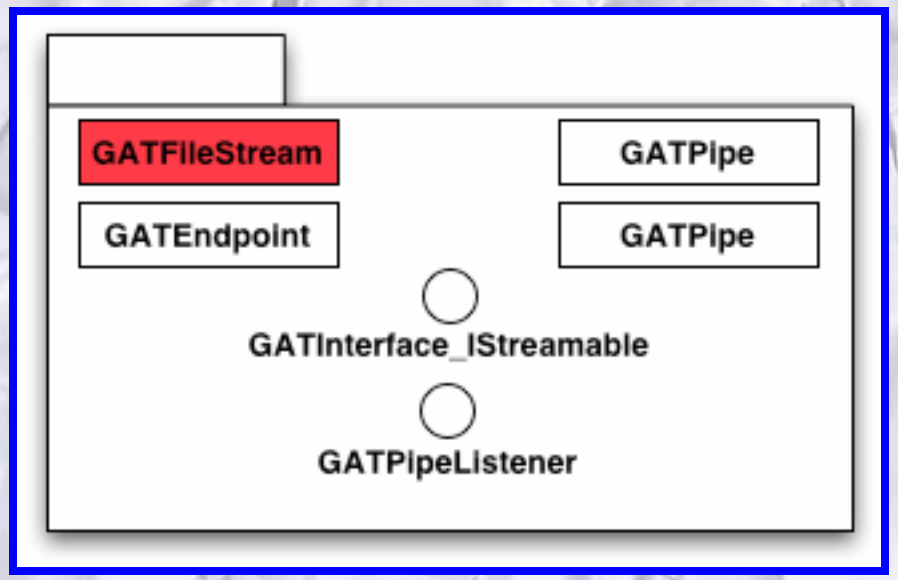
… and consists of various classes and interfaces.



FileStream Management

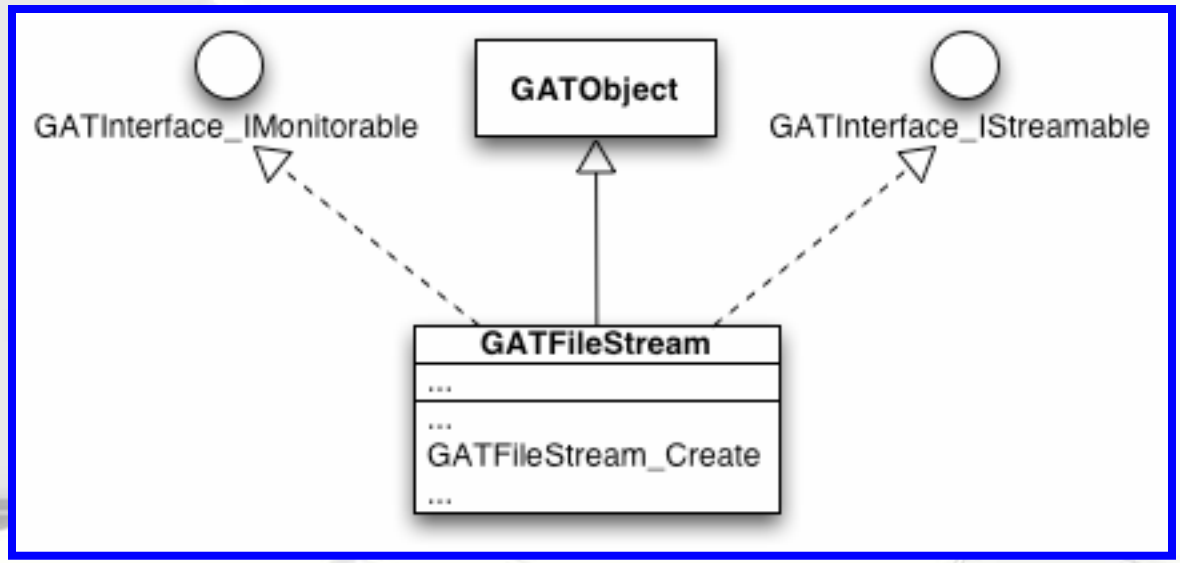
- Stream Package
  - Overview

We'll cover only GATFileStream.



FileStream Management

- Stream Package
  - GATFileStream class streams data to/from a file



FileStream Management

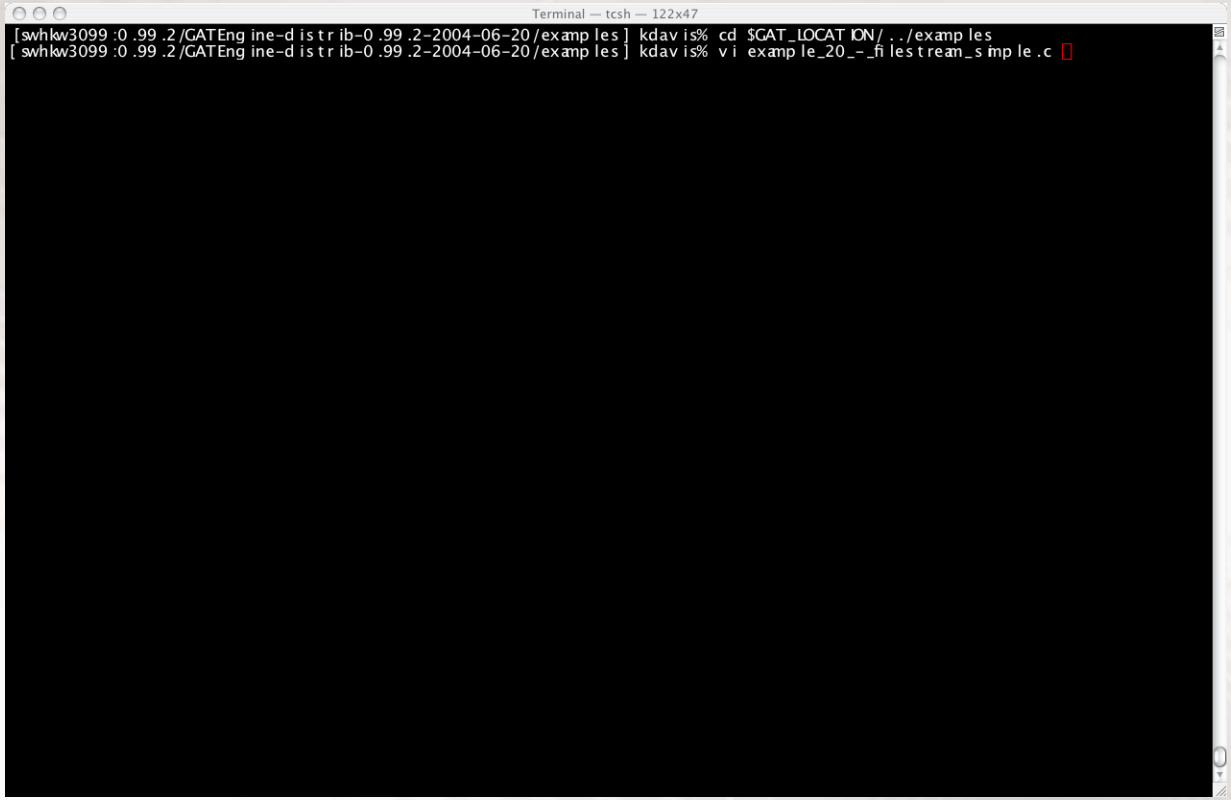
- Code
  - Example

```
cd $GAT_LOCATION/../examples
```

FileStream Management

- Code
  - Example

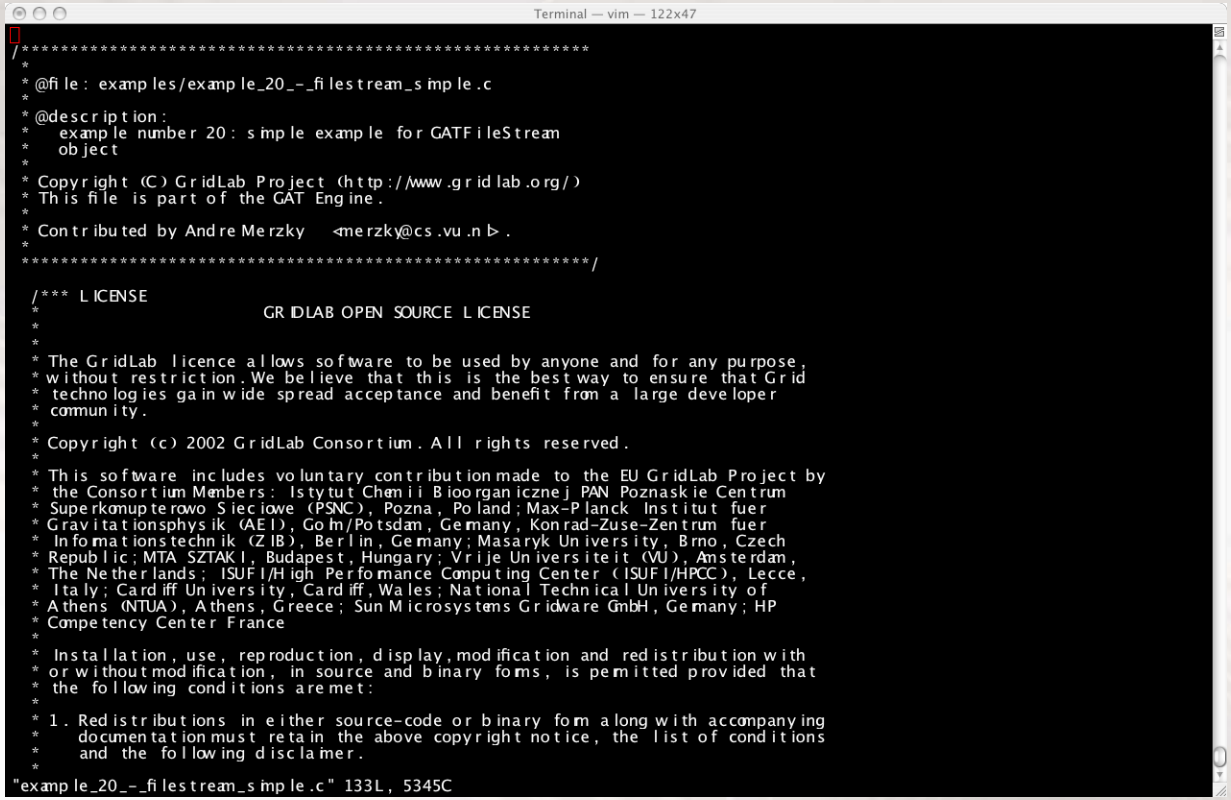
```
vi example_20_-_filestream_simple.c
```



FileStream Management

- Code
  - Example

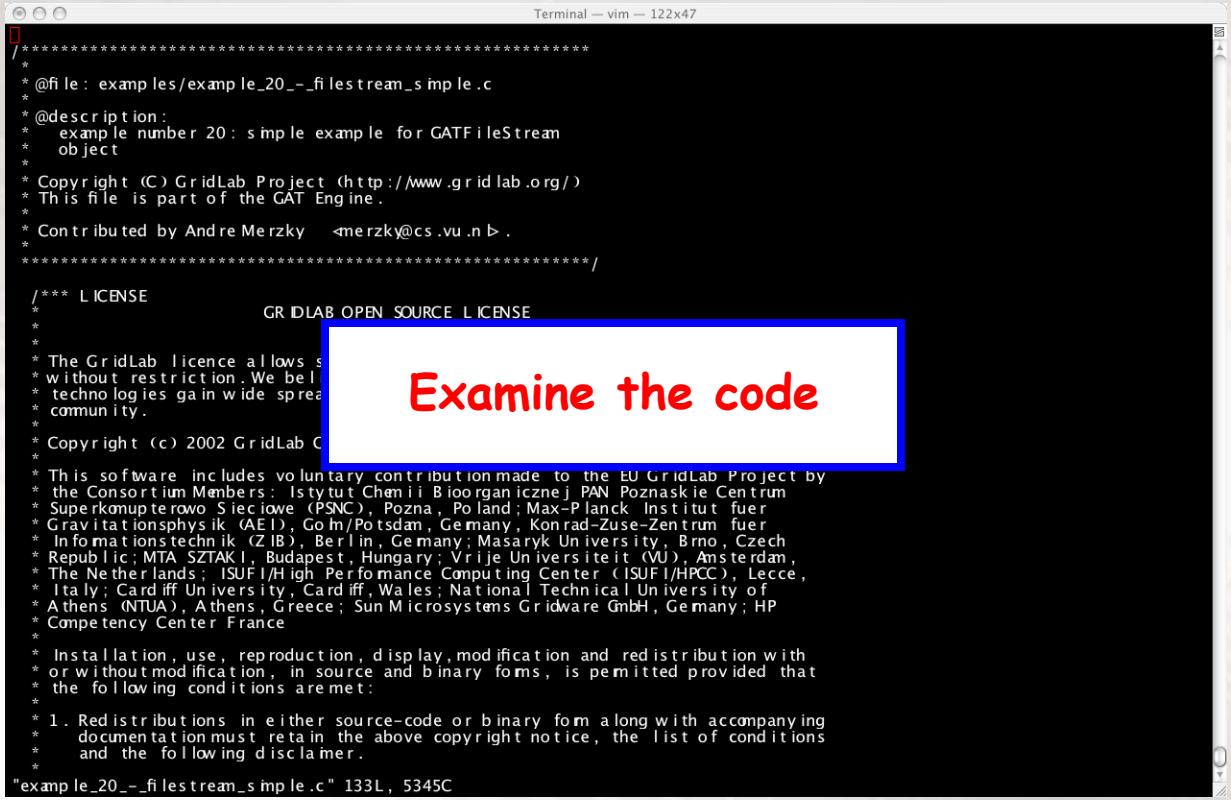
vi example_20_-_filestream_simple.c



FileStream Management

- Code
  - Example

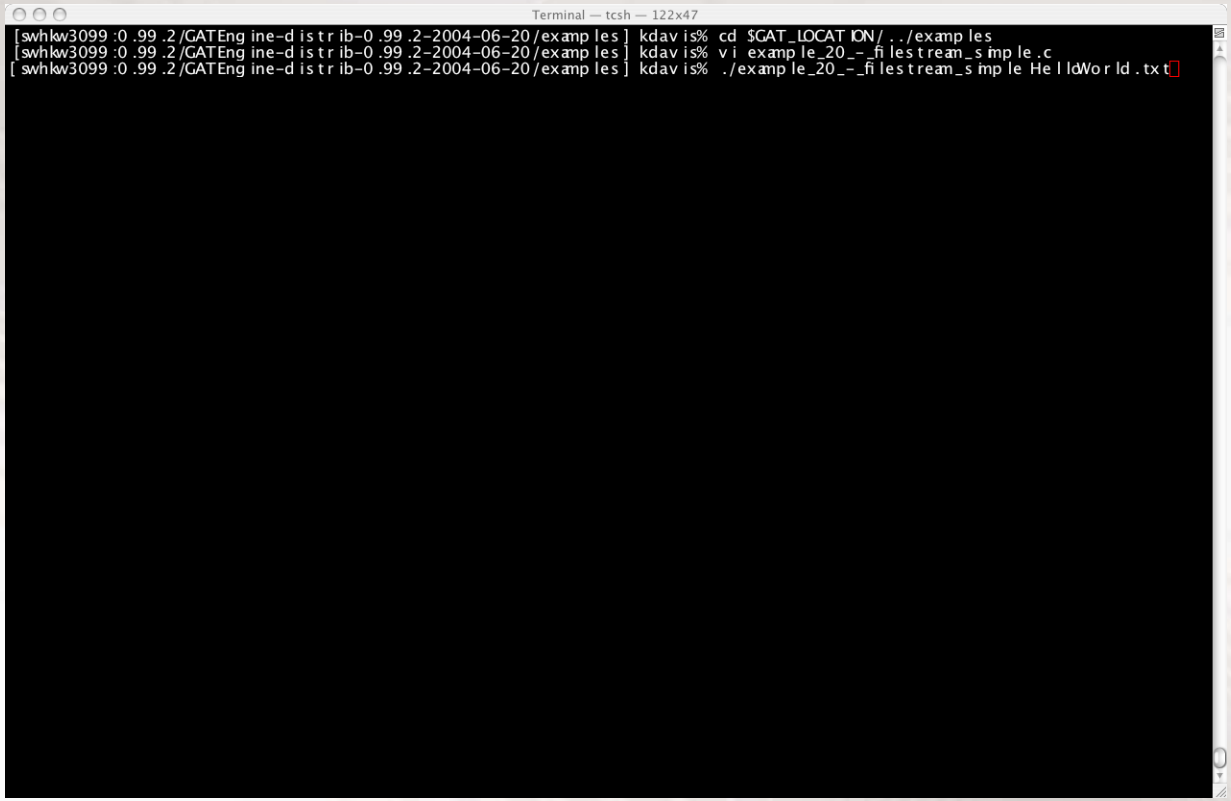
vi example_20_-_filestream_simple.c



FileStream Management

- Code
  - Example

```
./example_20_-_filestream_simple HelloWorld.txt
```



FileStream Management

- Code
  - Exercise

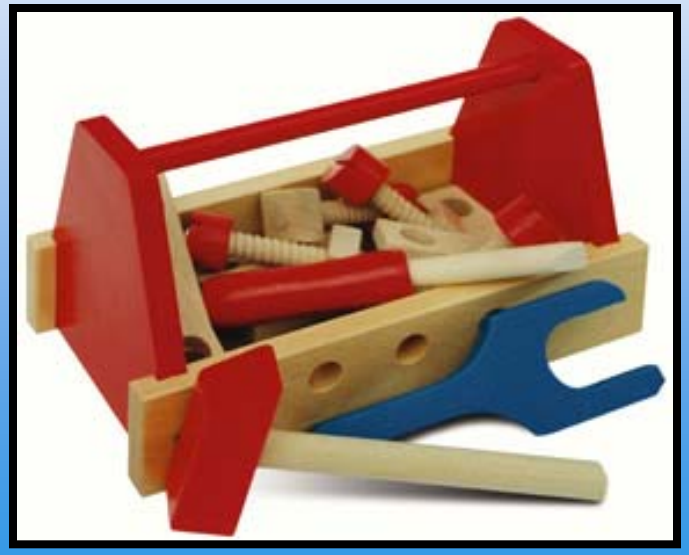
Modify example_20_-_filestream_simple.c to write your name, say, to file.

LogicalFile Management

Kelly Davis

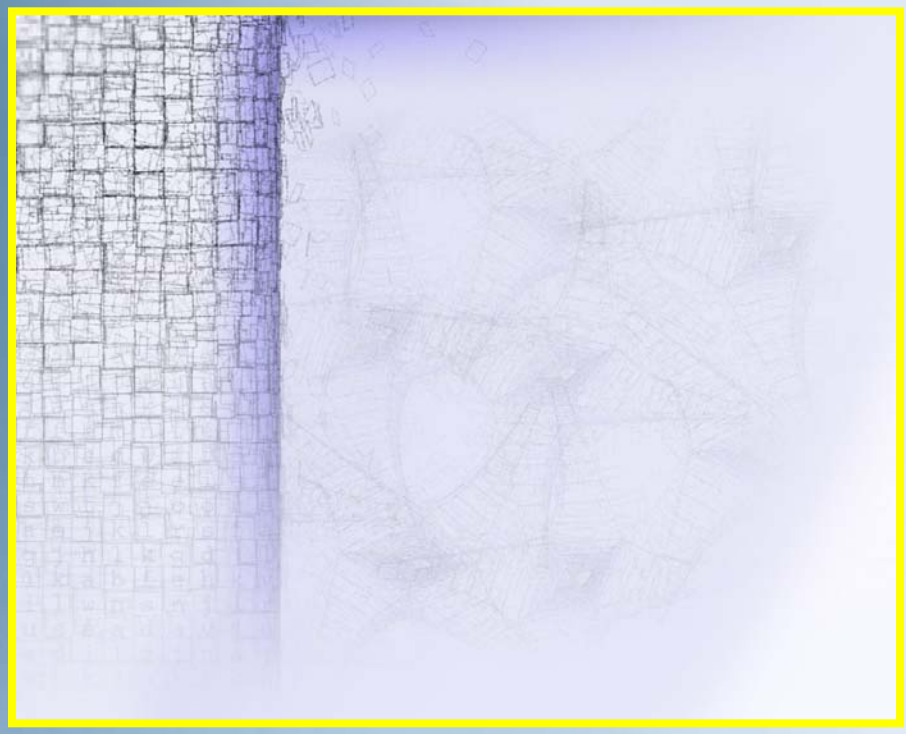
kdavis@aei.mpg.de

MPI-AEI



LogicalFile Management: Outline

- LogicalFile Package
  - Overview
  - GATLogicalFile class
- Code
  - Example



LogicalFile Management

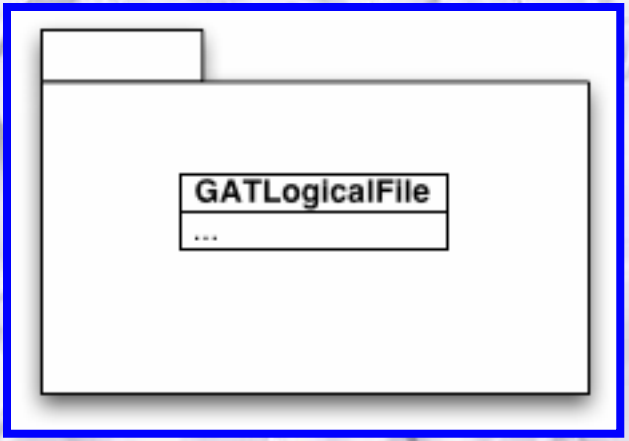
- LogicalFile Package
  - Overview

The LogicalFile Package exists to replicate files which are identical, but dispersed geographically in an efficient manner.

LogicalFile Management

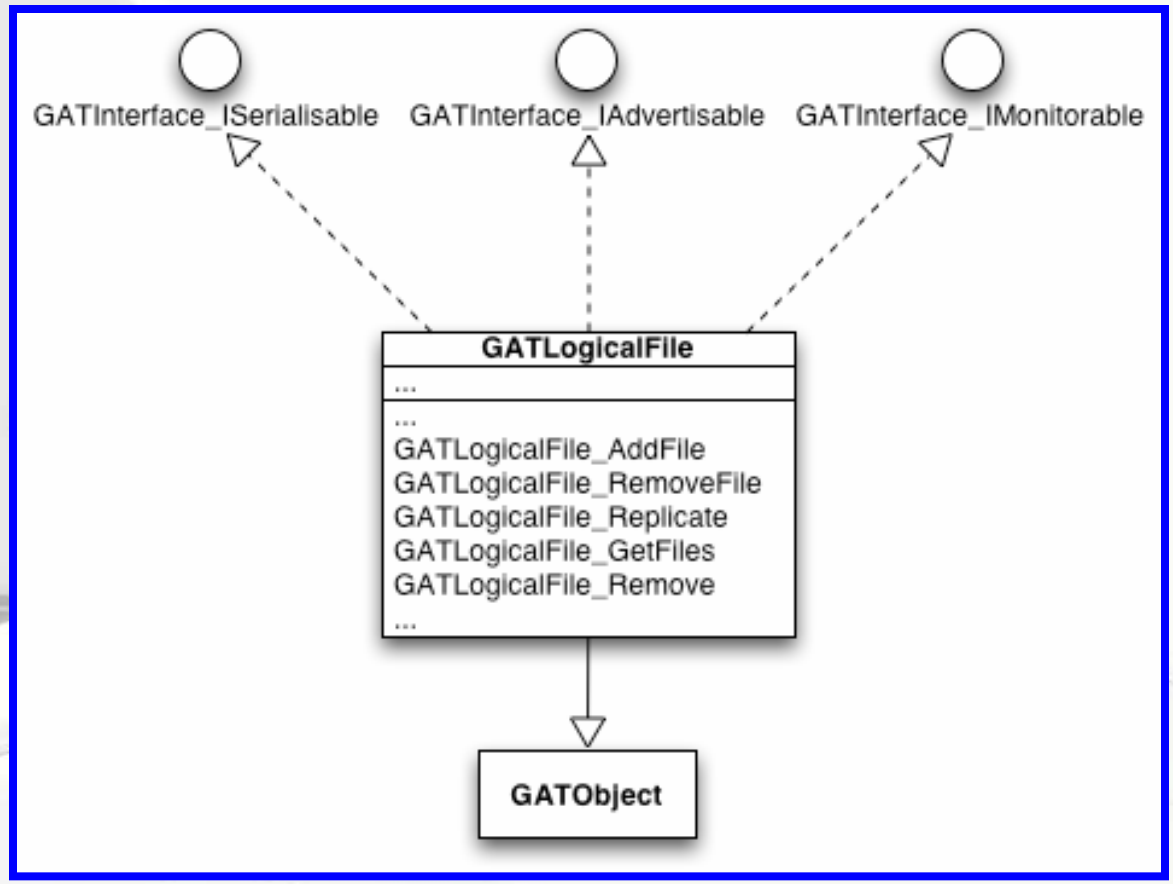
- LogicalFile Package
  - Overview

…and consists of a single class!



LogicalFile Management

- LogicalFile Package
  - GATLogicalFile class replicates files in a “Grid” environment



LogicalFile Management

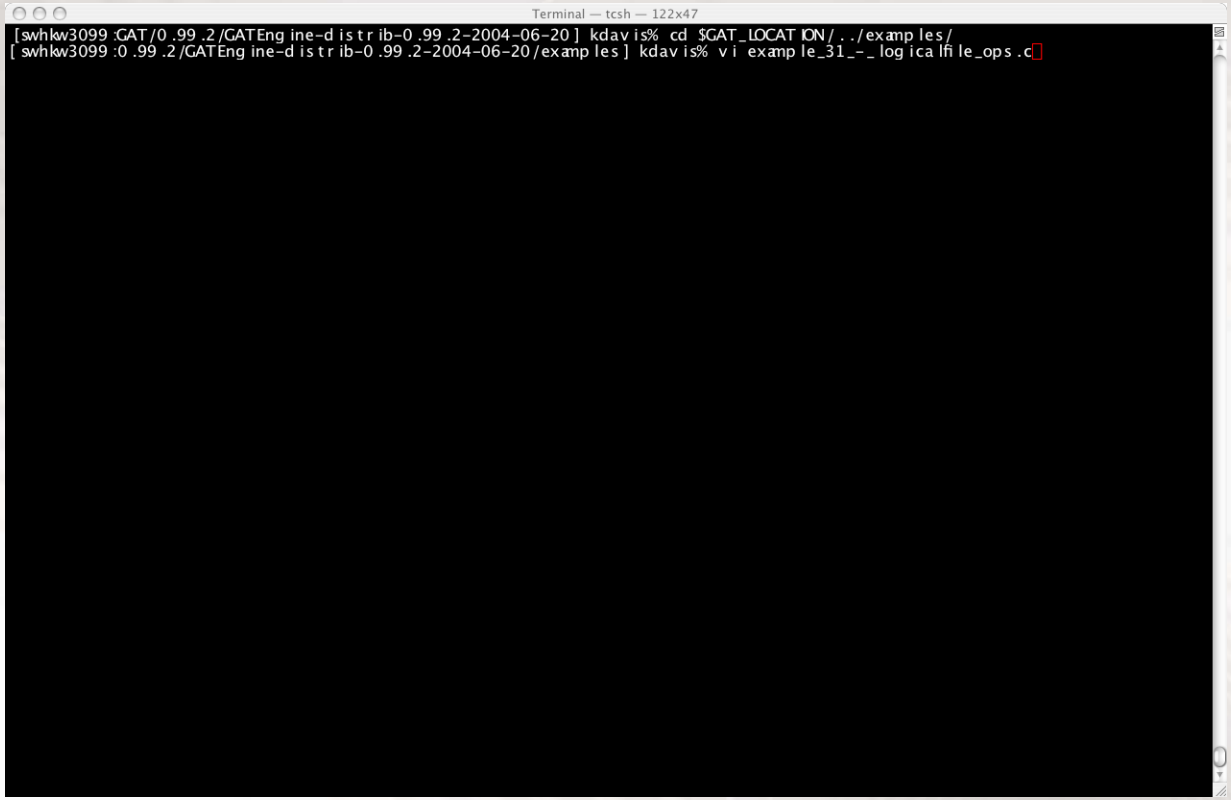
- Code
  - Example

```
cd $GAT_LOCATION/../examples
```

LogicalFile Management

- Code
  - Example

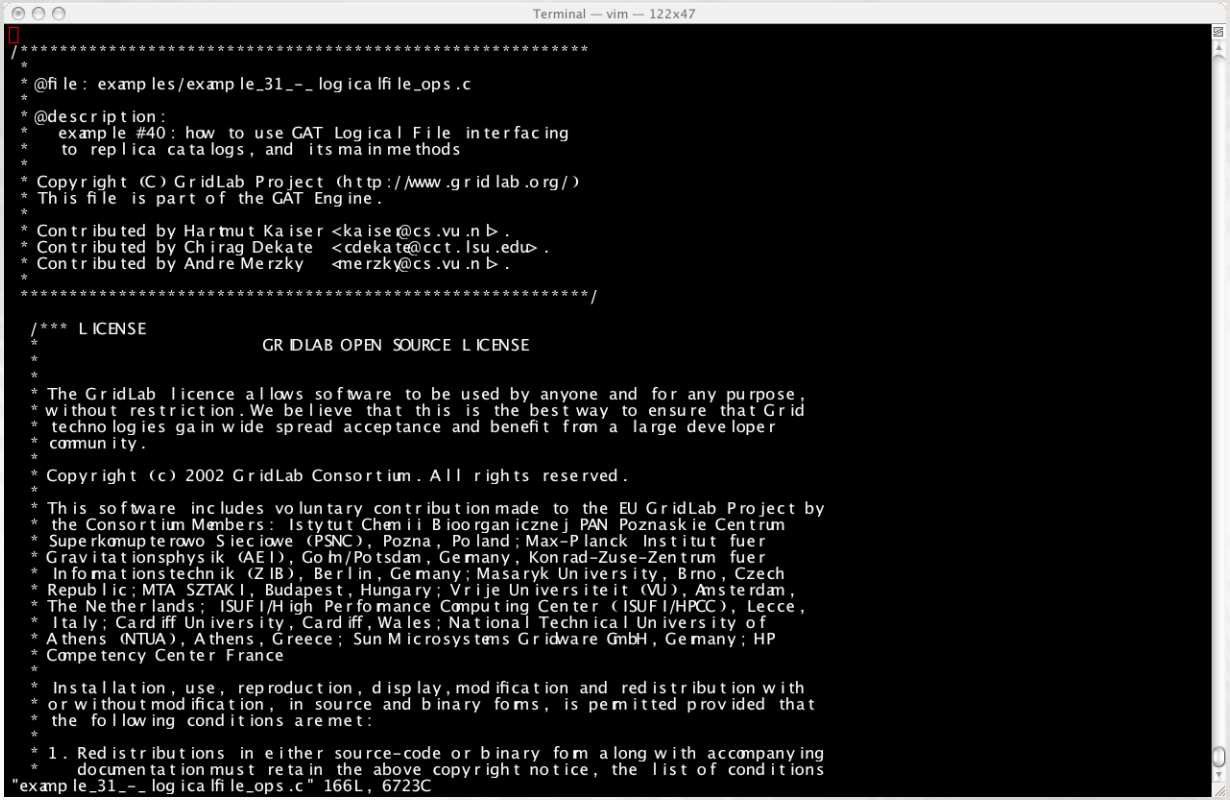
```
vi example_31_-_logicalfile_ops.c
```



LogicalFile Management

- Code
  - Example

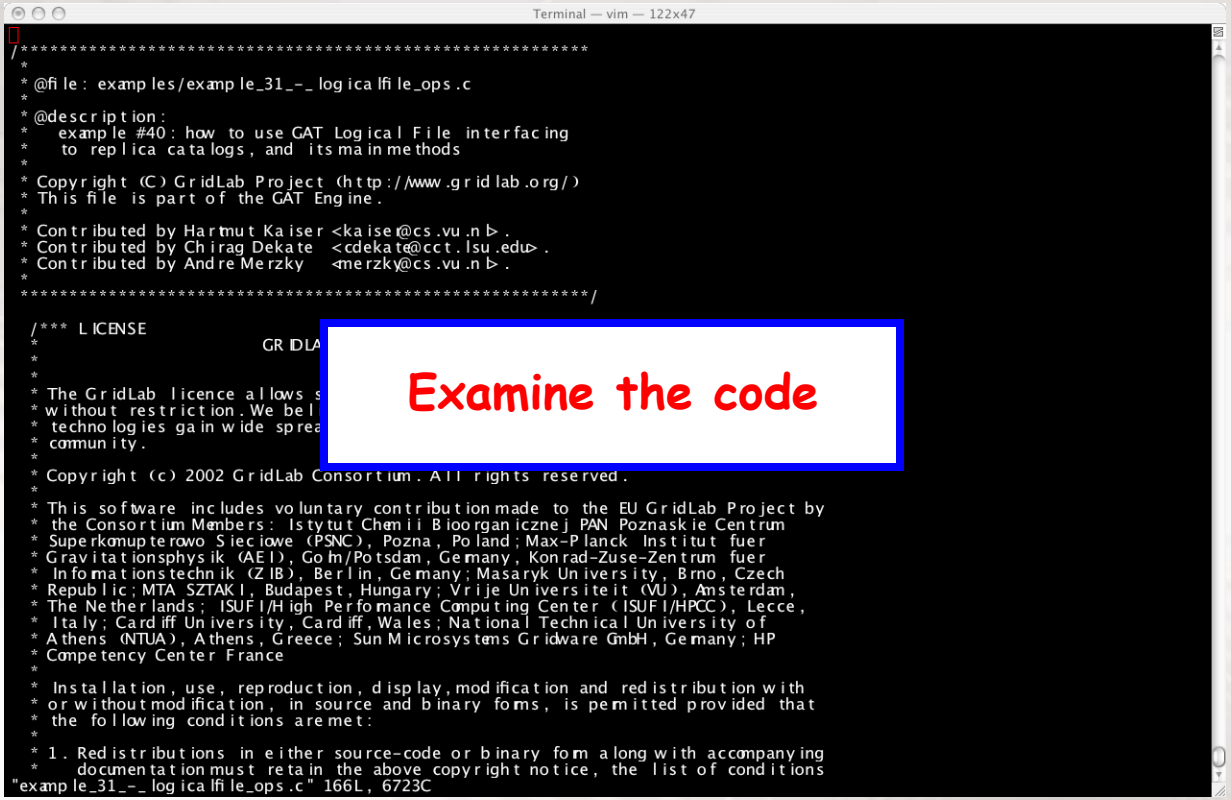
vi example_31_-_logicalfile_ops.c



LogicalFile Management

- Code
  - Example

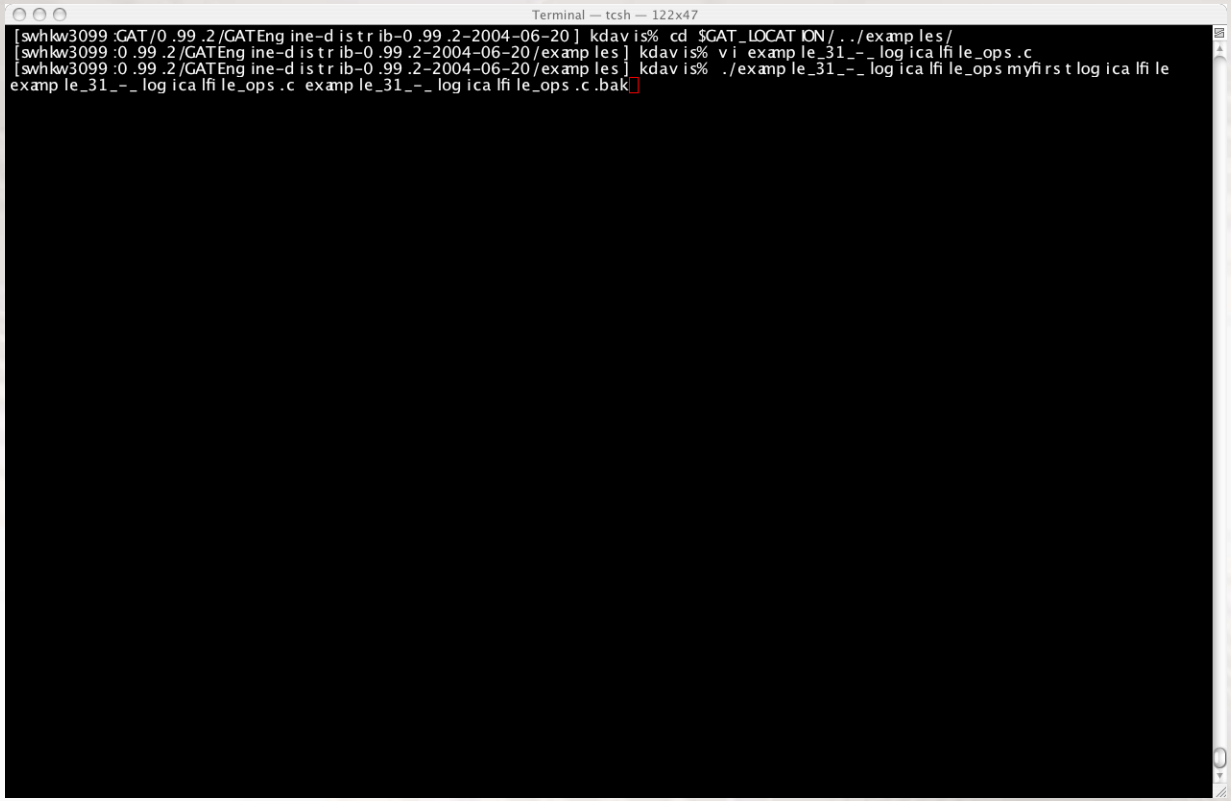
vi example_31_-_logicalfile_ops.c



LogicalFile Management

- Code
  - Example

```
./example_31_-_logicalfile_ops myfirstlogicalfile\
example_31_-_logicalfile_ops.c example_31_-_logicalfile_ops.c.bak
```

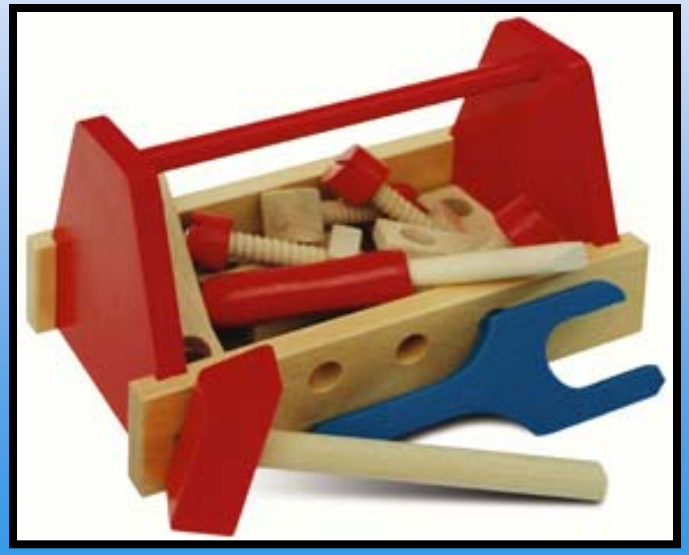


Advert Management

Kelly Davis

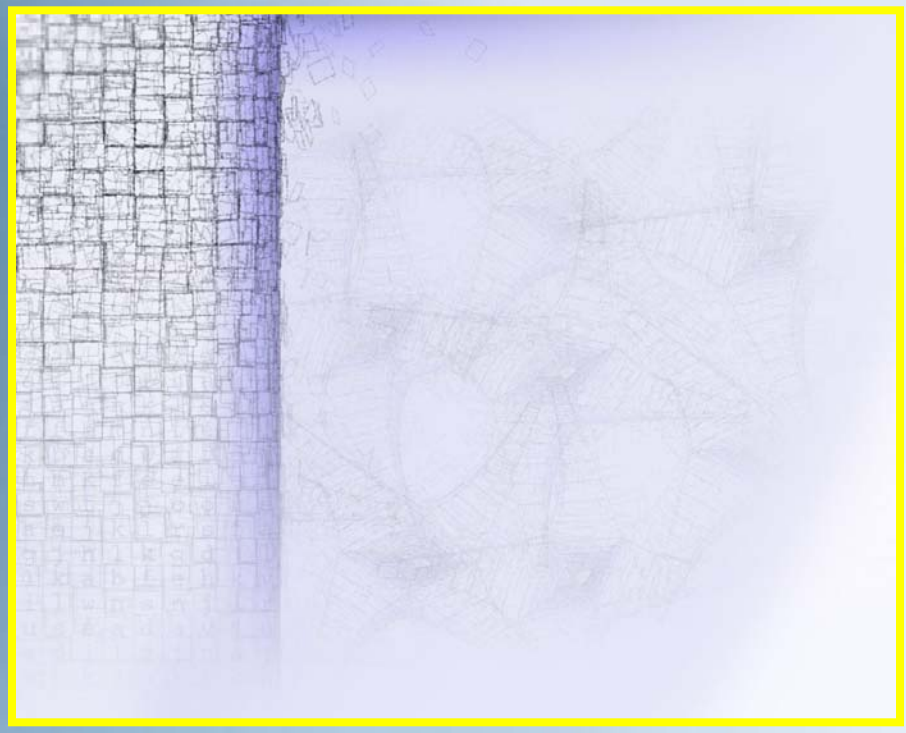
kdavis@aei.mpg.de

MPI-AEI



Advert Management

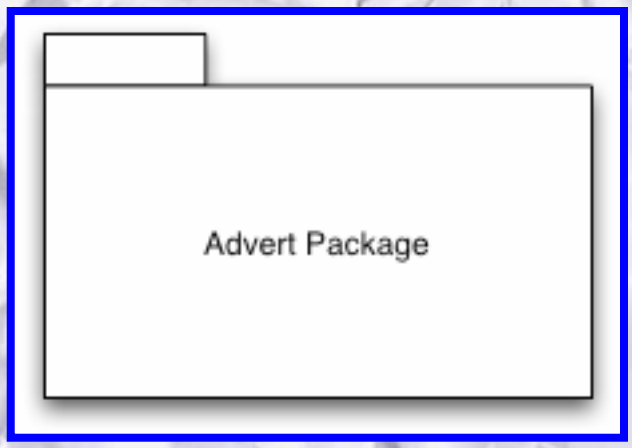
- Advert Package
  - Overview
  - GATInterface_Iadvertisable
  - GATAdvertService class
- Code
  - Example



Advert Management

- Advert Package
  - Overview

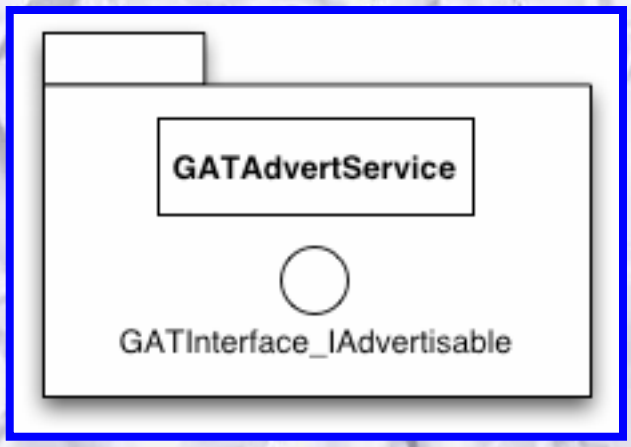
The Advert Package allows an application to persistently store objects "advertisables", query such stored advertisables, and move such advertisables across machine and language boundaries.



Advert Management

- Advert Package
  - Overview

… and consists of only one class and one interface.



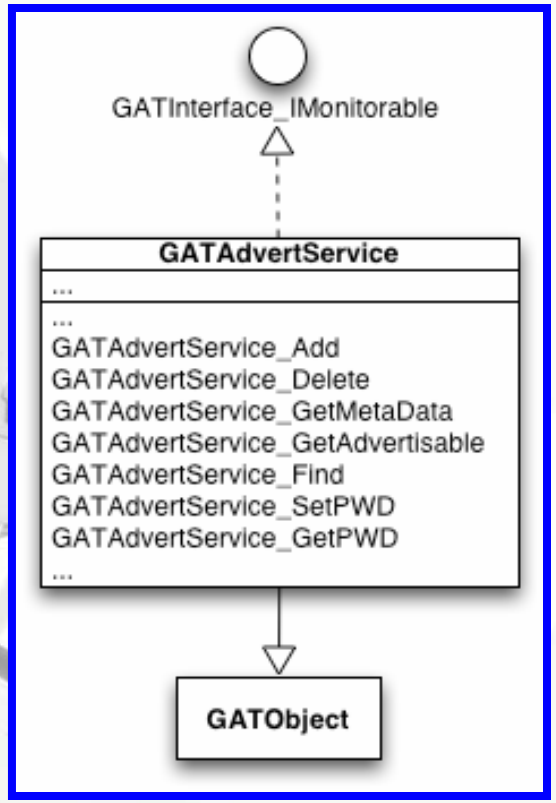
Advert Management

- Advert Package
  - GATInterface_IAdvertisable

The interface `GATInterface_IAdvertisable` **marks objects capable of being persisted in a** `GATAdvertService`**, it's similar to Java's serilizable.**

Advert Management

- Advert Package
  - GATAdvertService - Stores advertisables and allows one to query for these advertisables across machine boundaries.



Advert Management

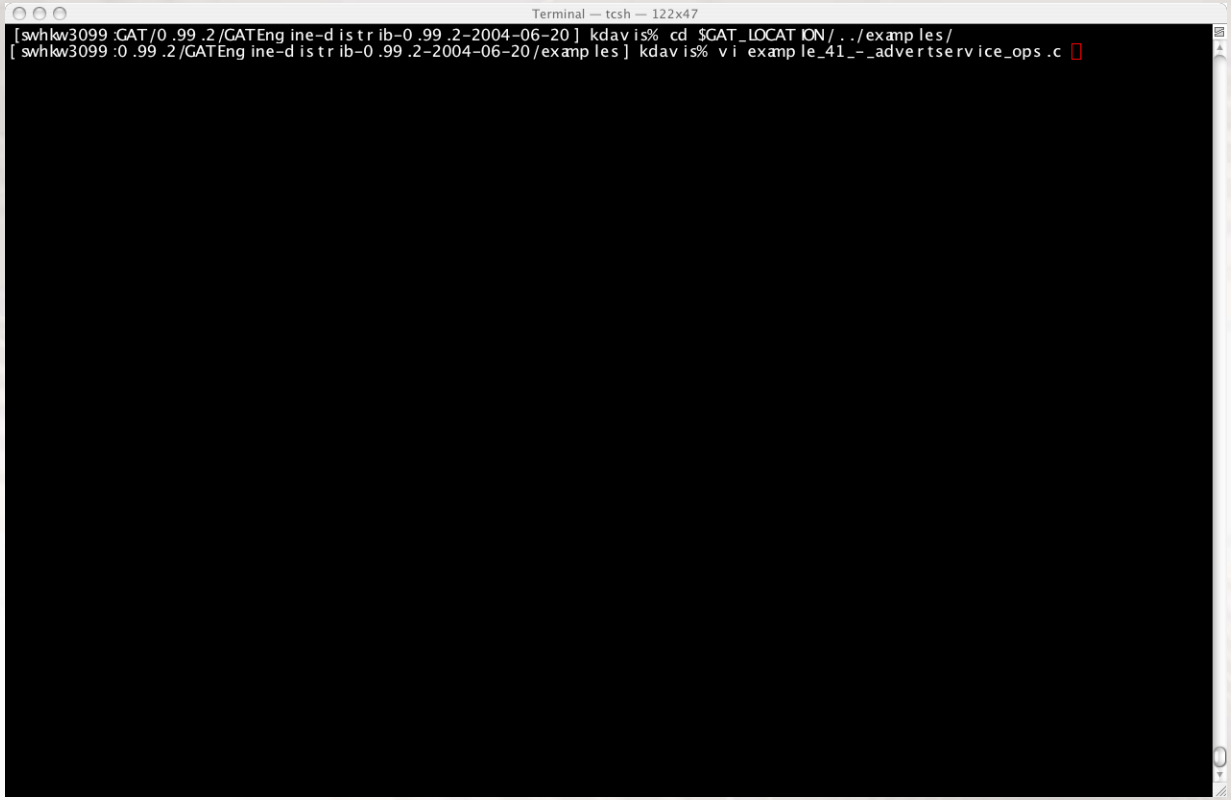
- Code
  - Example

```
cd $GAT_LOCATION/../examples
```

Advert Management

- Code
  - Example

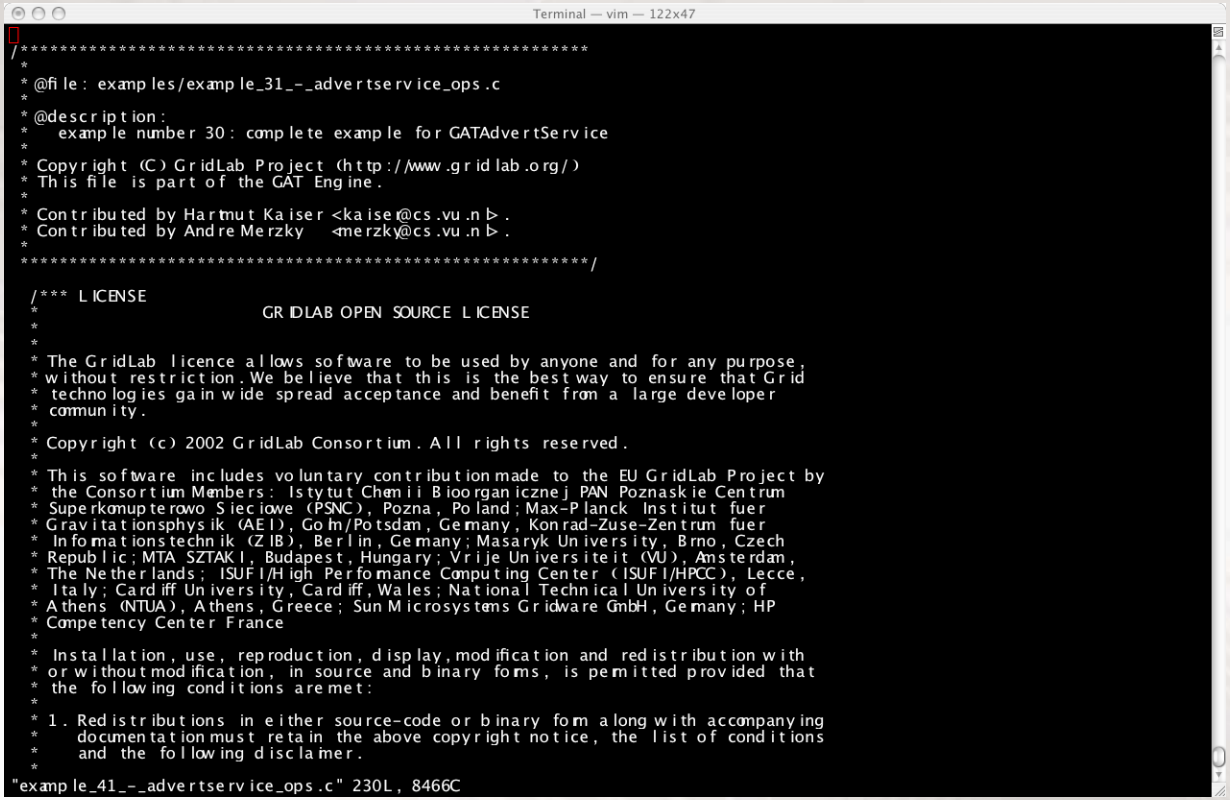
```
vi example_41_-_advertservice_ops.c
```



Advert Management

- Code
  - Example

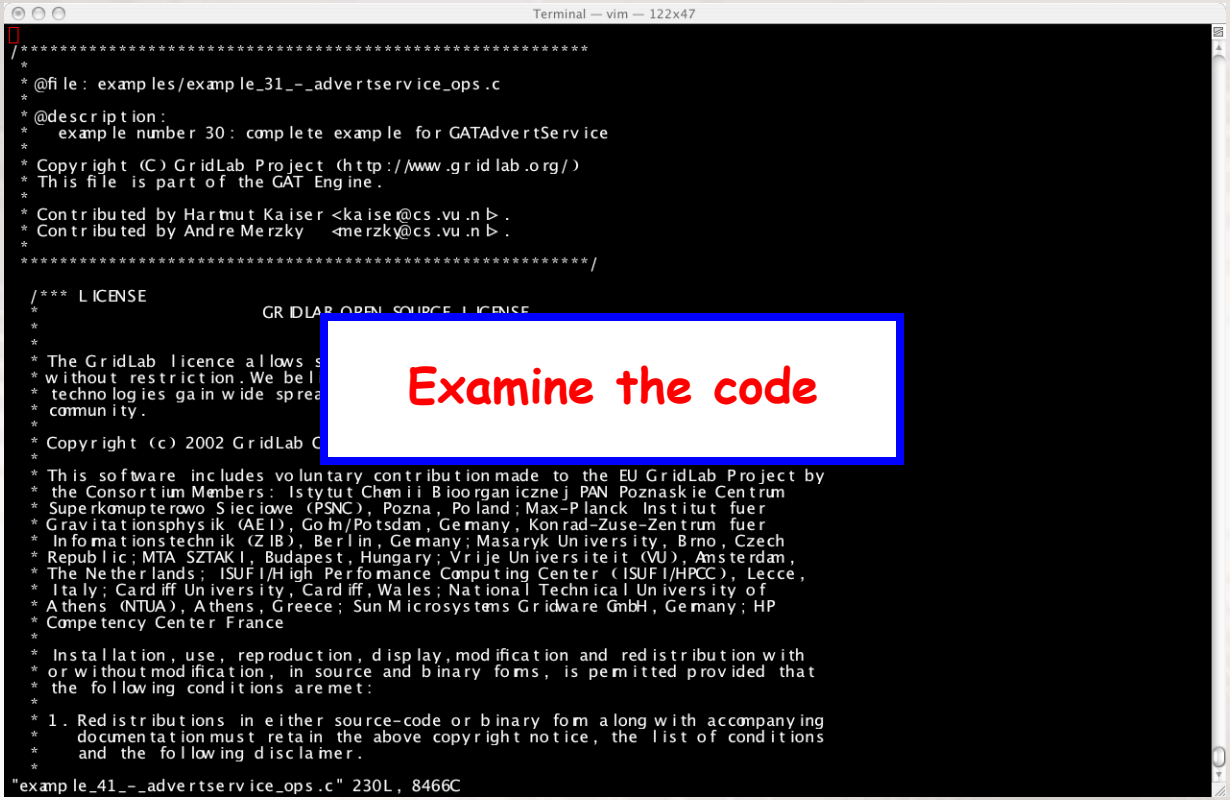
    vi example_41_-_advertservice_ops.c



Advert Management

- Code
  - Example

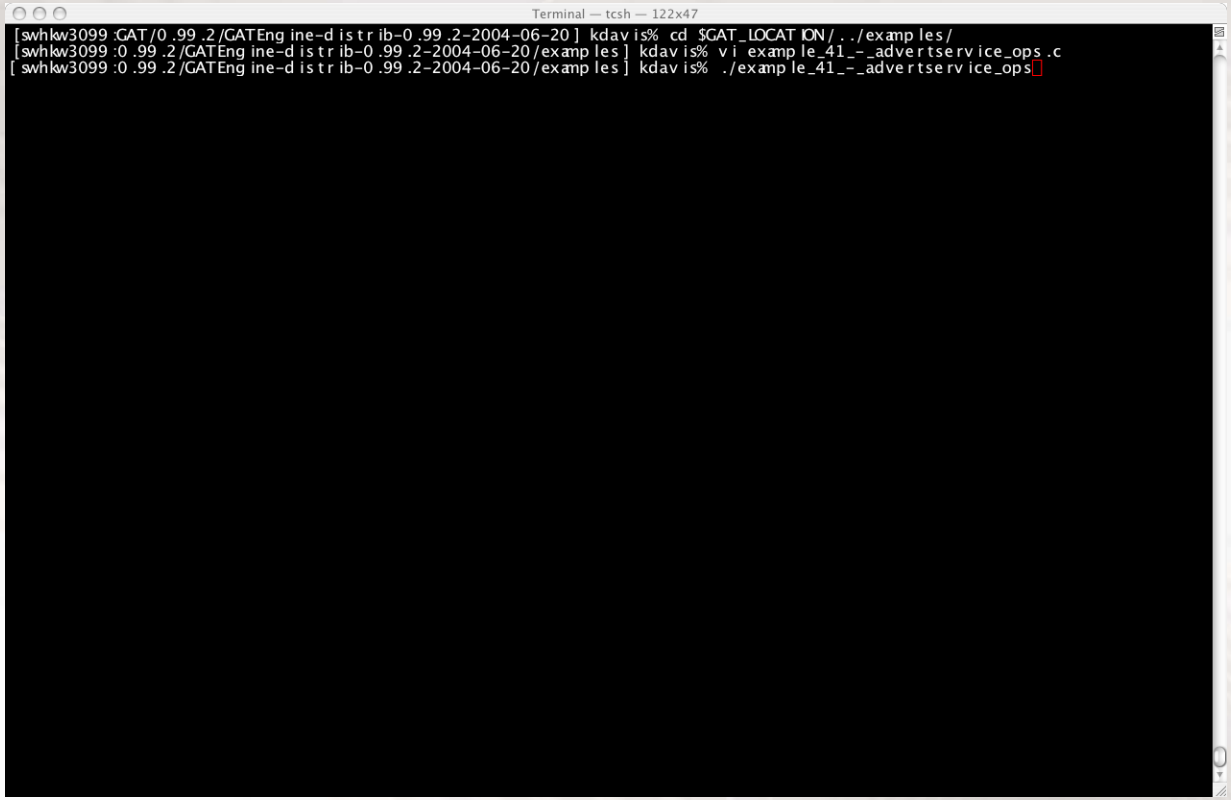
    vi example_41_-_advertservice_ops.c



Advert Management

- Code
  - Example

./example_41_-_advertservice_ops

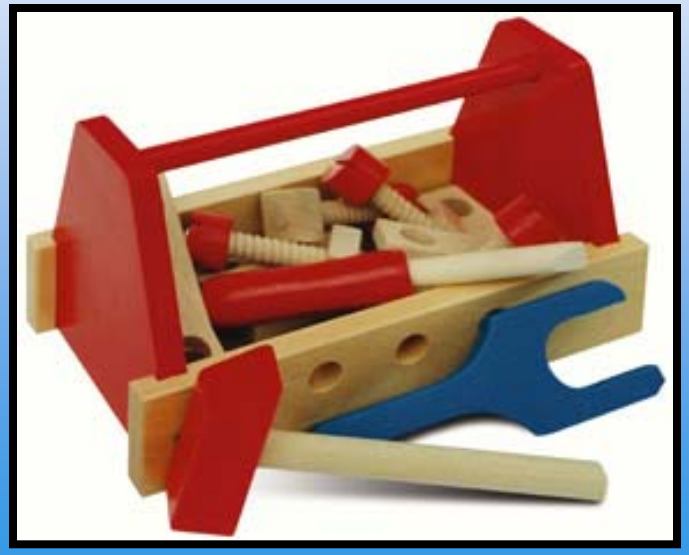


Job Management

Kelly Davis

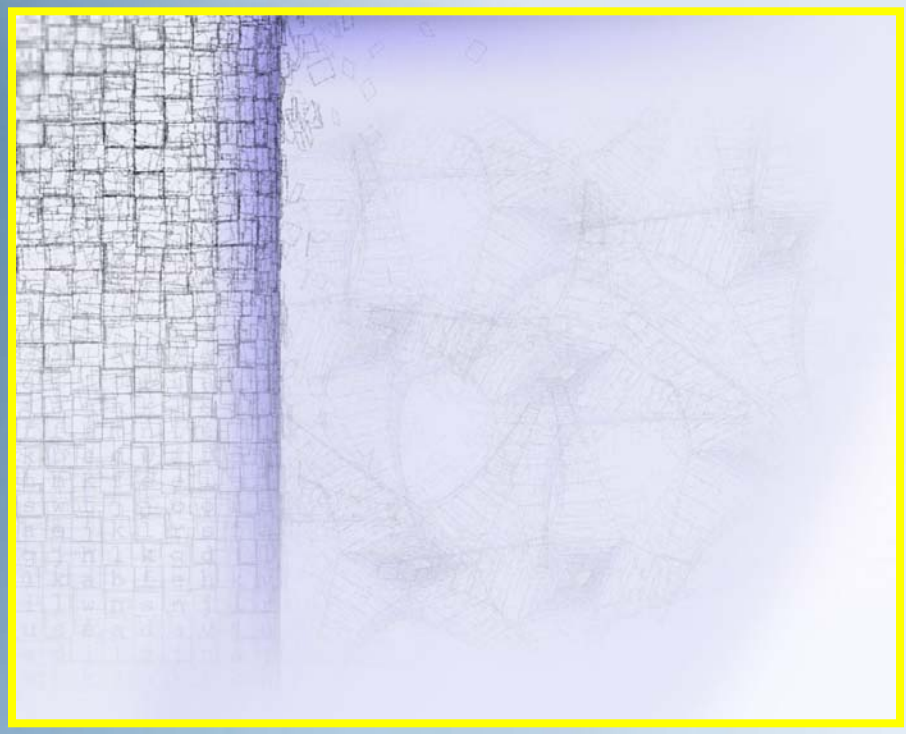
kdavis@aei.mpg.de

MPI-AEI



Job Management: Outline

- Job Package
  - Overview
  - GATResourceDescription's
  - GATResource's
  - GATResourceBroker
  - GATSoftwareDescription
  - GATJobDescription
  - GATJob
- Code
  - Example



Job Management

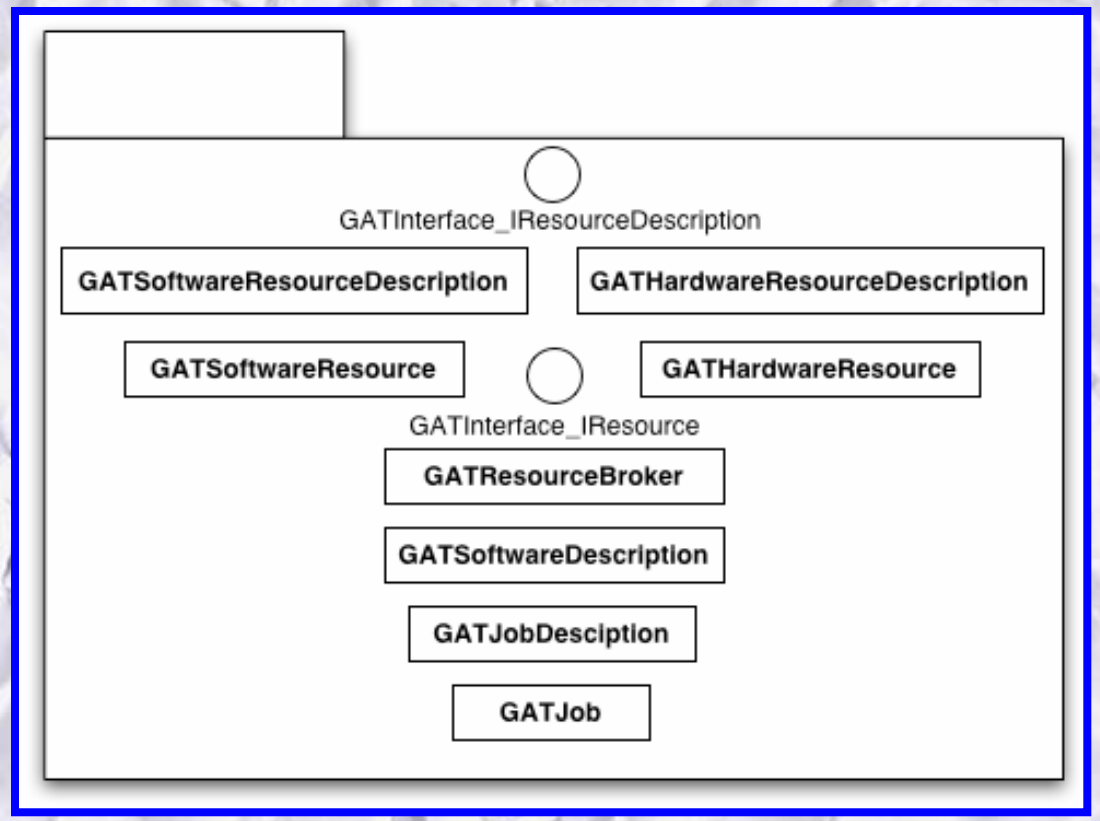
- Job Package

The Job Package allows an application to obtain resource, reserve resources, and submit and manage jobs.

Job Management

- Job Package

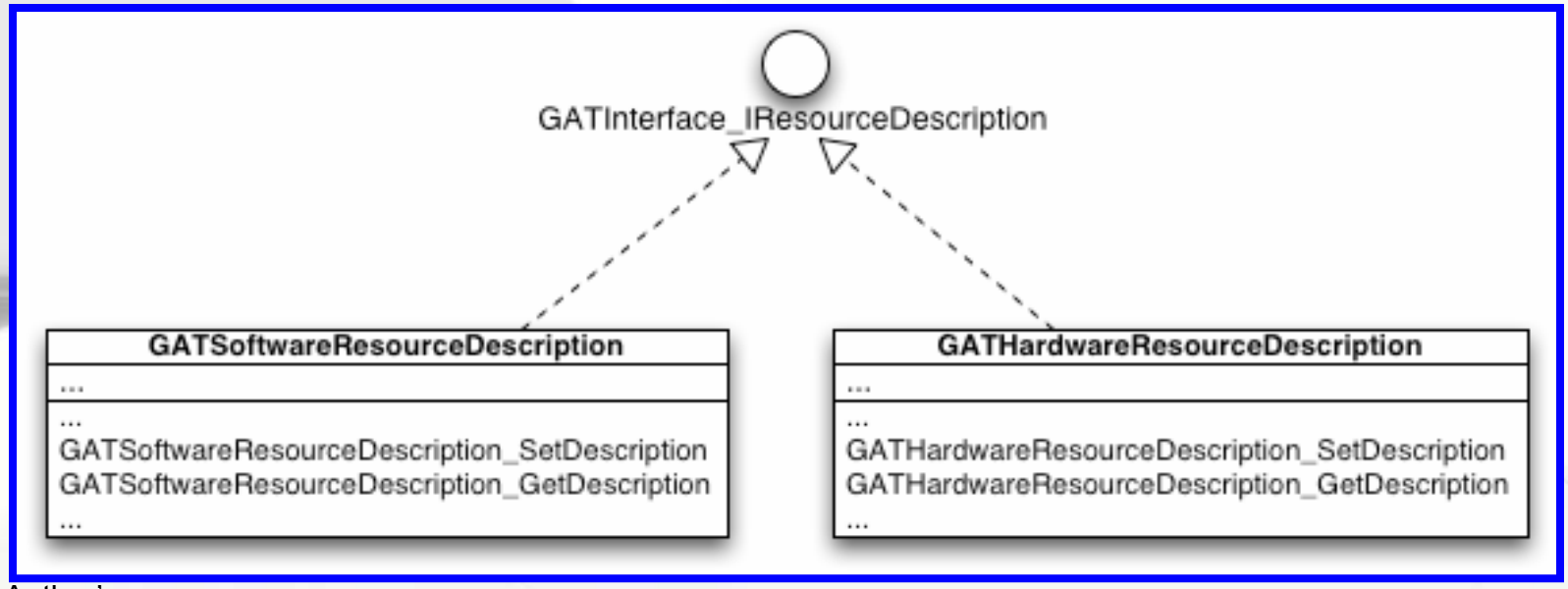
…and consists of many classes and interfaces.



Job Management

- Job Package
  - GATResourceDescription's

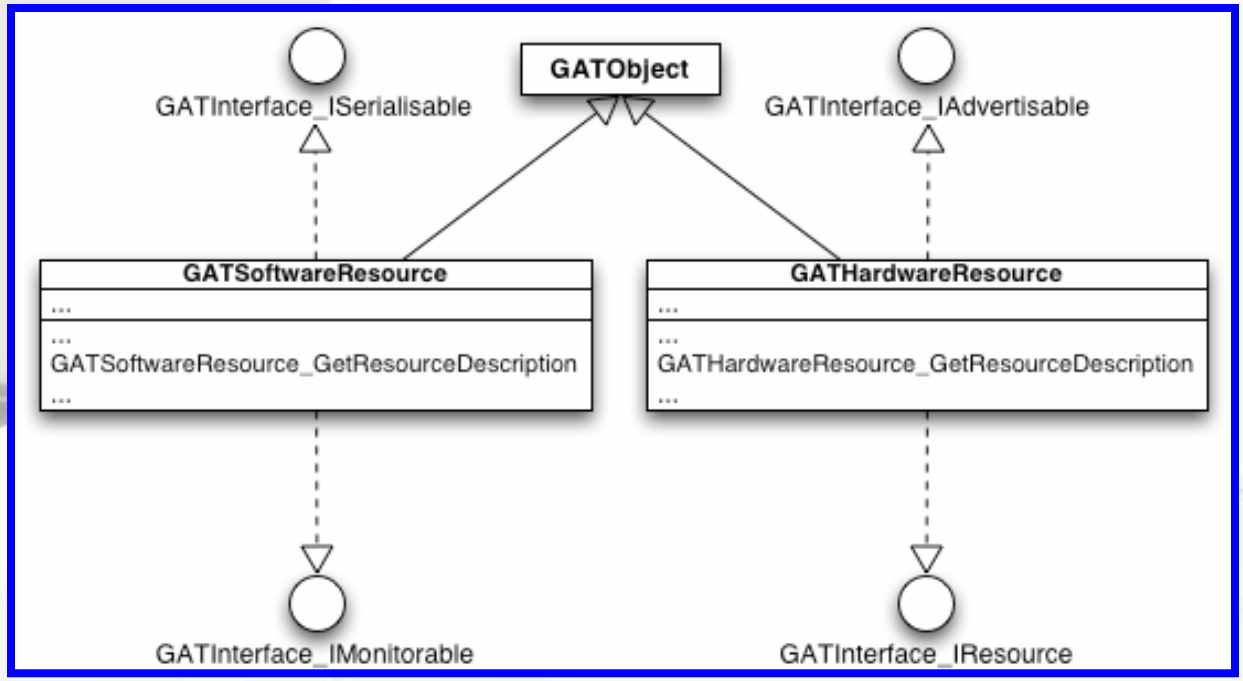
A `GATHardwareResourceDescription` describes a hardware resource, such as a Linux box with 1GB of memory. A `GATSoftwareResourceDescription` describes a software resource, such as an OS.



Job Management

- Job Package
  - GATResource's

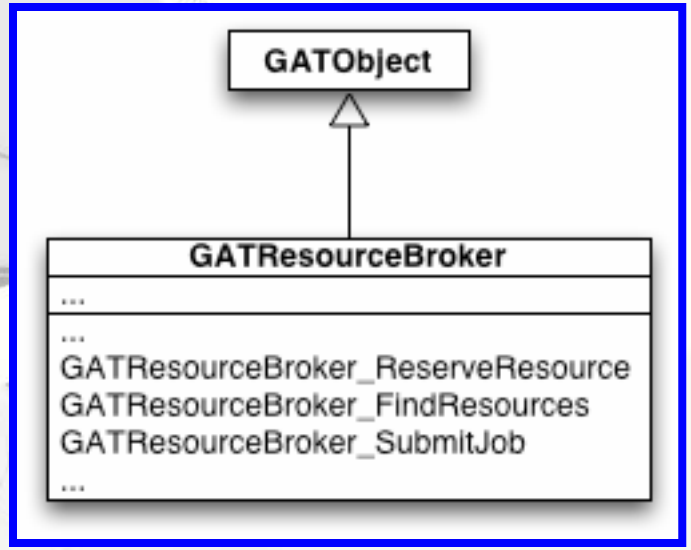
A `GATHardwareResource` represents a hardware resource, such as a Linux box with 1GB of memory. A `GATSoftwareResource` represents a software resource, such as a running OS.



Job Management

- Job Package
  - GATResourceBroker

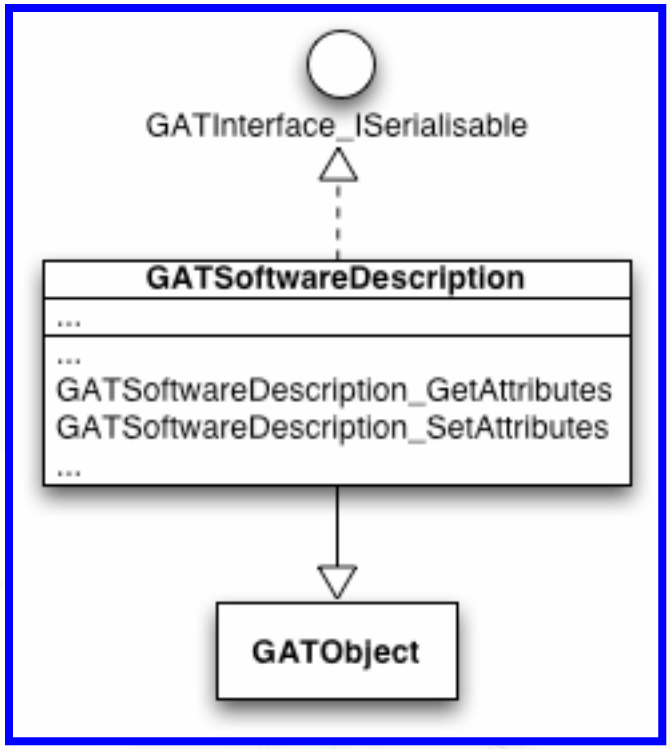
A `GATResourceBroker` instance is able to broker resources, it can find or reserve resources; also, it can submit jobs to such resources.



Job Management

- Job Package
  - GATSoftwareDescription

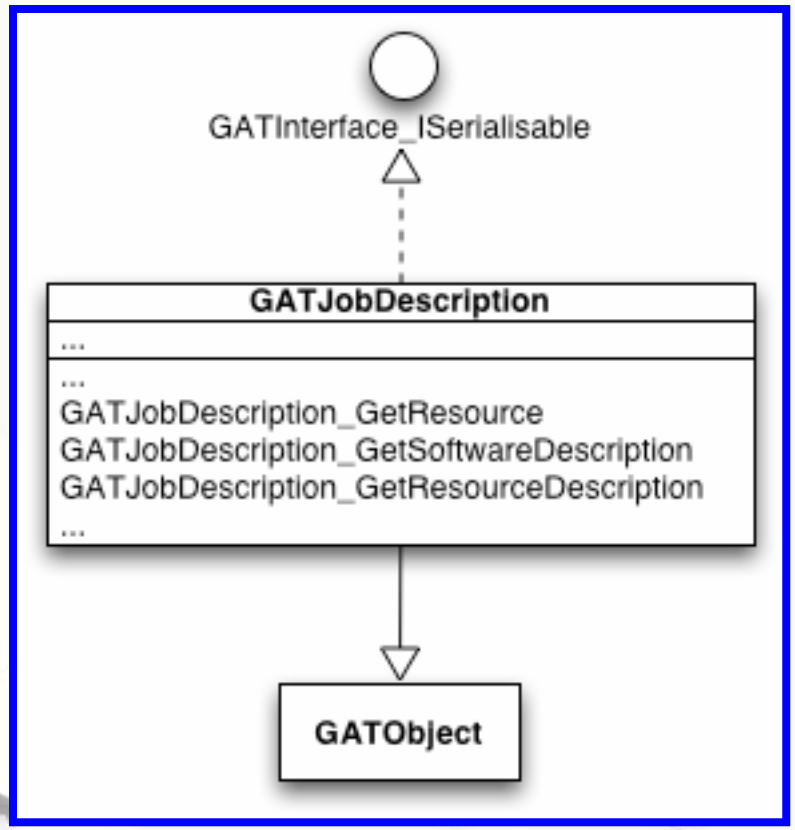
A `GATSoftwareDescription` instance describes an executable, for example `/bin/date`



Job Management

- Job Package
  - GATJobDescription

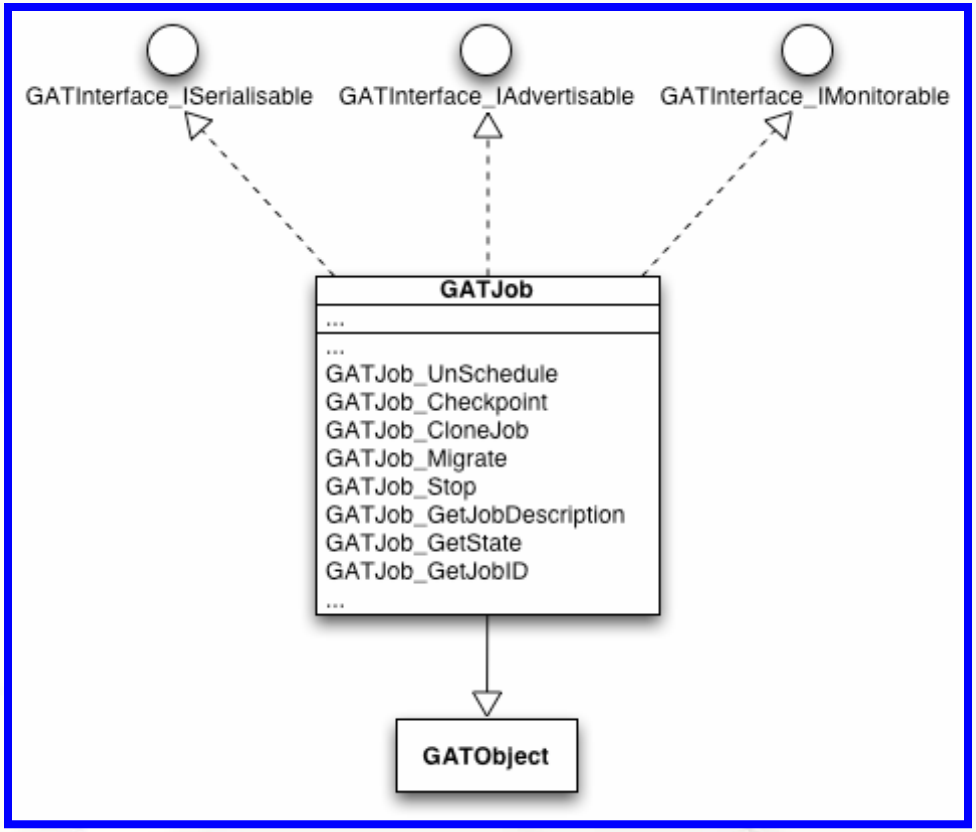
A `GATJobDescription` instance describes a job which is can be executed. It includes a description of the hardware and software for the job.



Job Management

- Job Package
  - GATJob

A GATJob represents a job that has been submitted to a resource management system.



Job Management

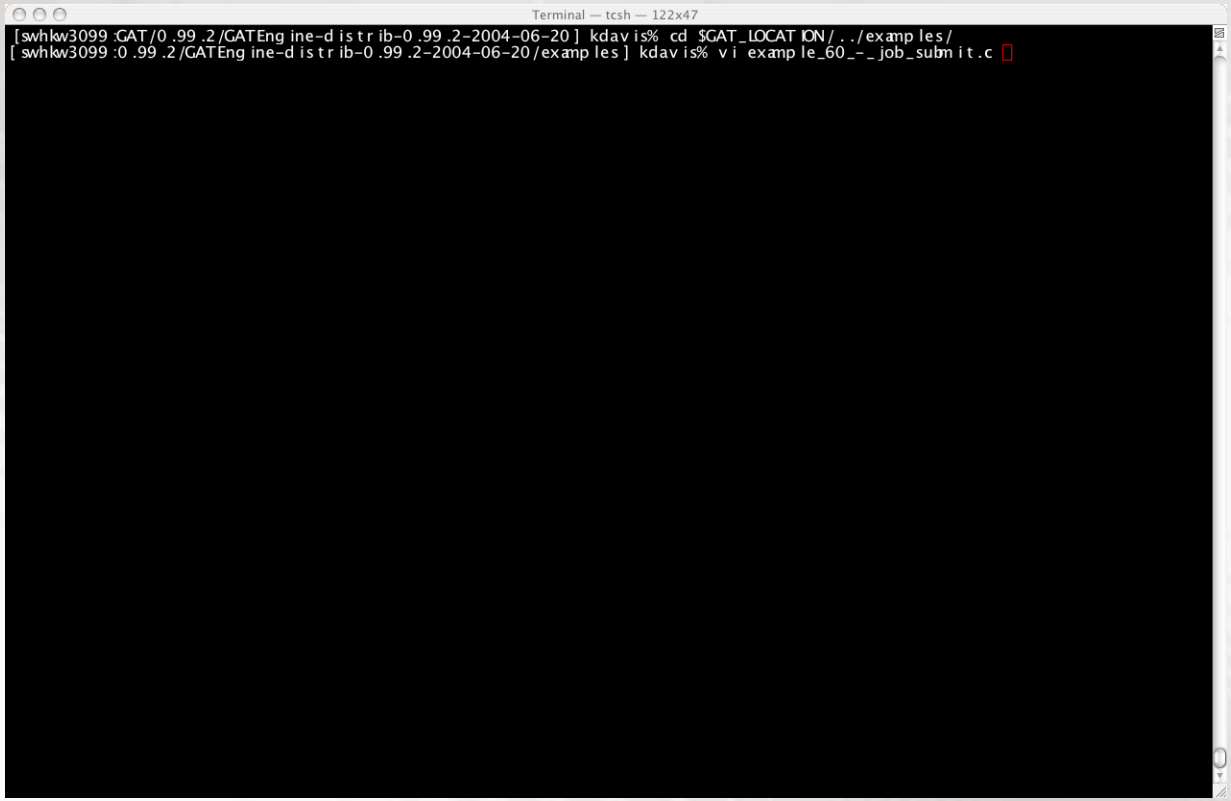
- Code
  - Example

```
cd $GAT_LOCATION/../examples
```

Job Management

- Code
  - Example

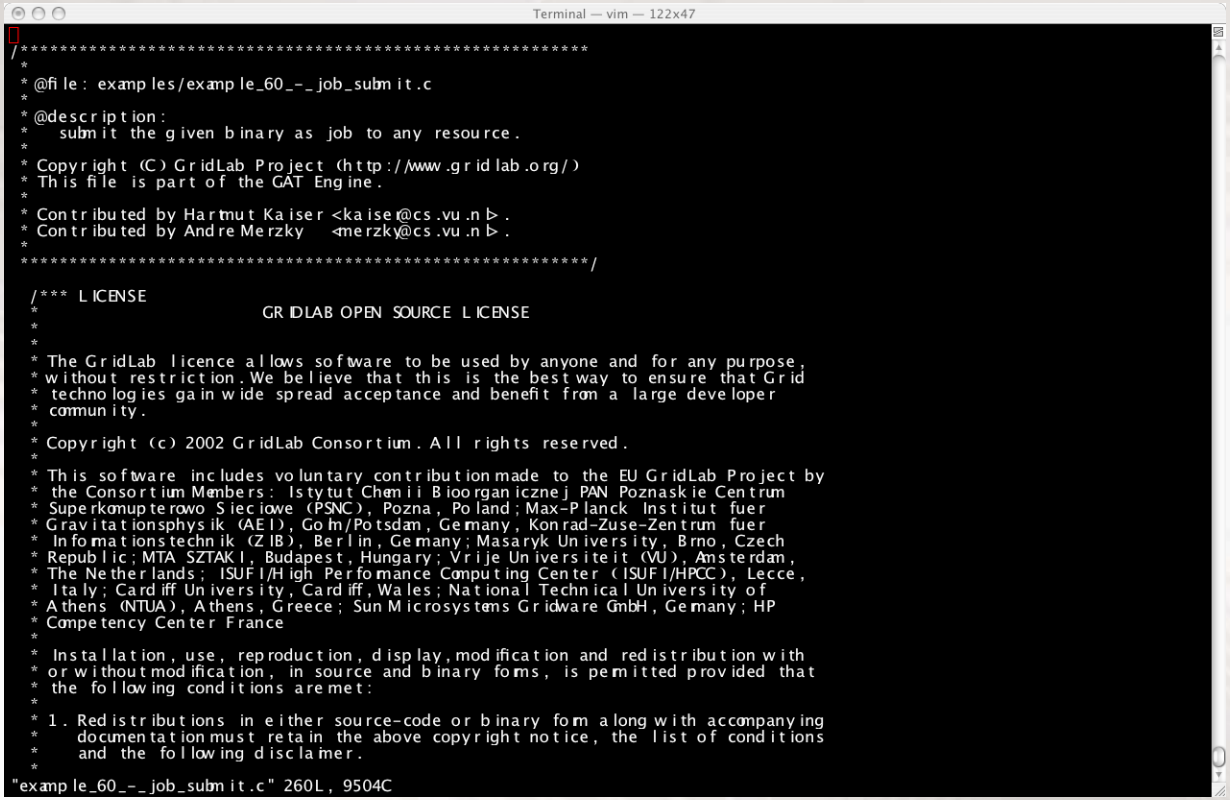
vi example_60_-_job_submit.c



Job Management

- Code
  - Example

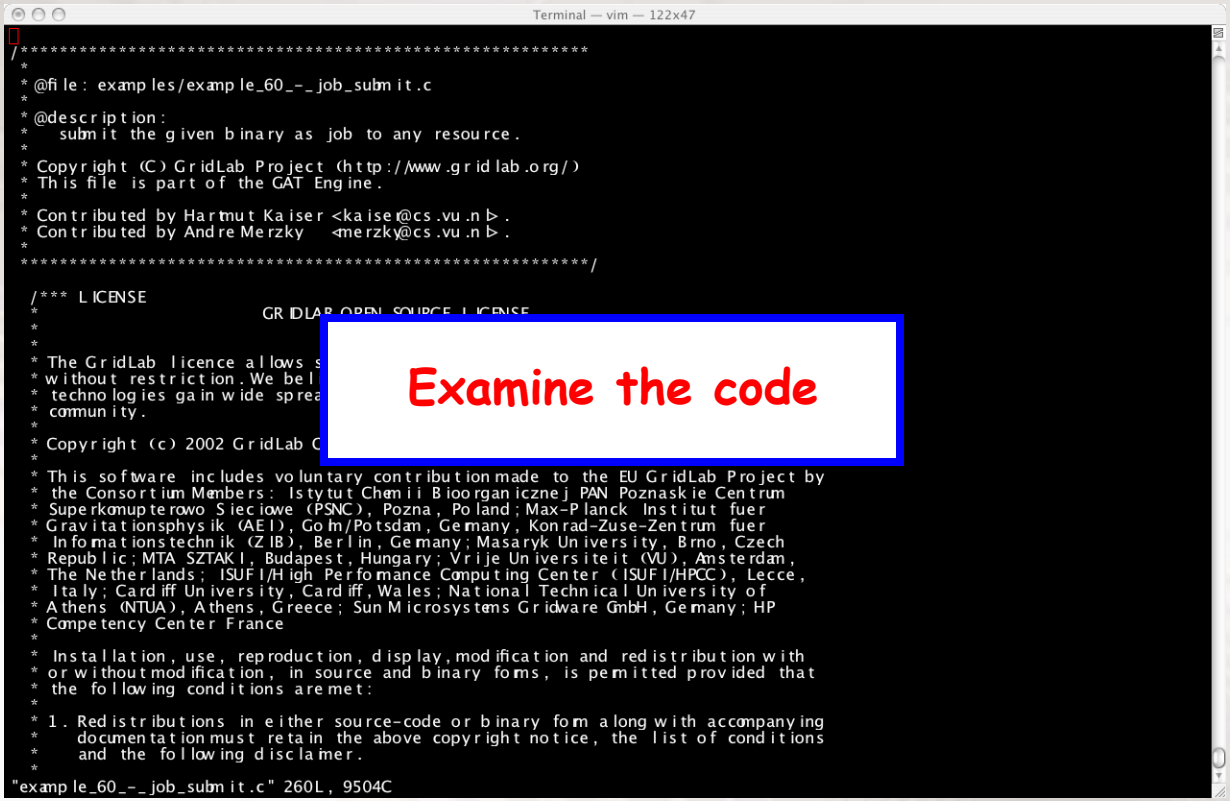
vi example_60_-_job_submit.c



Job Management

- Code
  - Example

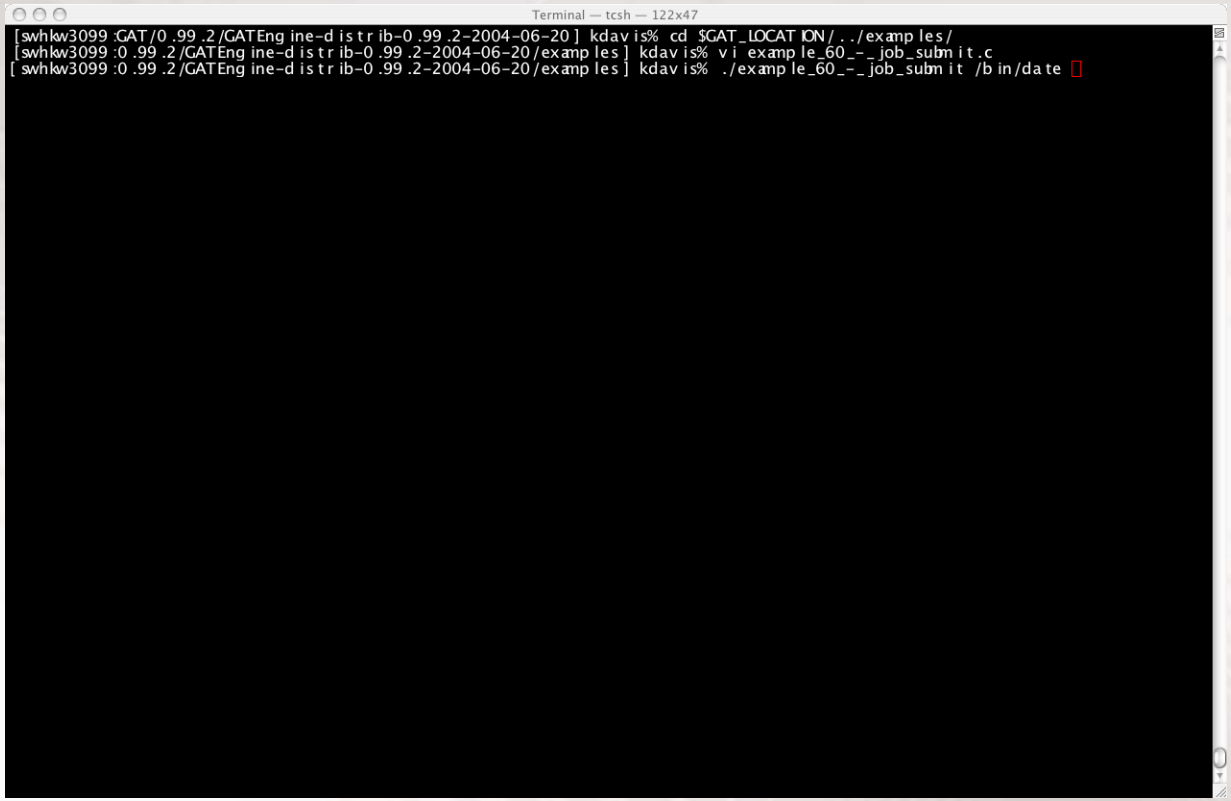
vi example_60_-_job_submit.c



Job Management

- Code
  - Example

./example_60_-_job_submit/bin/date

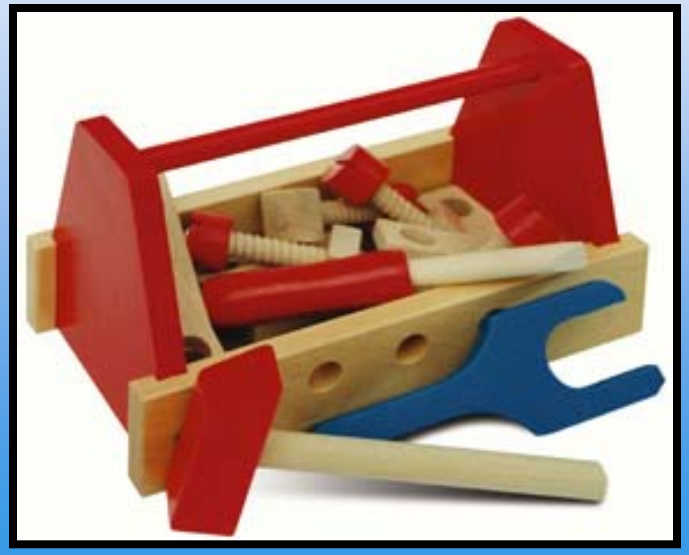


Endtroduction

Kelly Davis

kdavis@aei.mpg.de

MPI-AEI



Endtroduction

- GAT - The Grid Application Toolkit
  - Abstracts the Grid from application programmers
  - Gives application programmers a uniform Grid-API
  - Supports adaptors to plugin various grid technologies
- GAT-API
  - Simple to use
  - Supports major Grid functionalaties

That's All Folks!