



Recent enhancements

in **GAMS**

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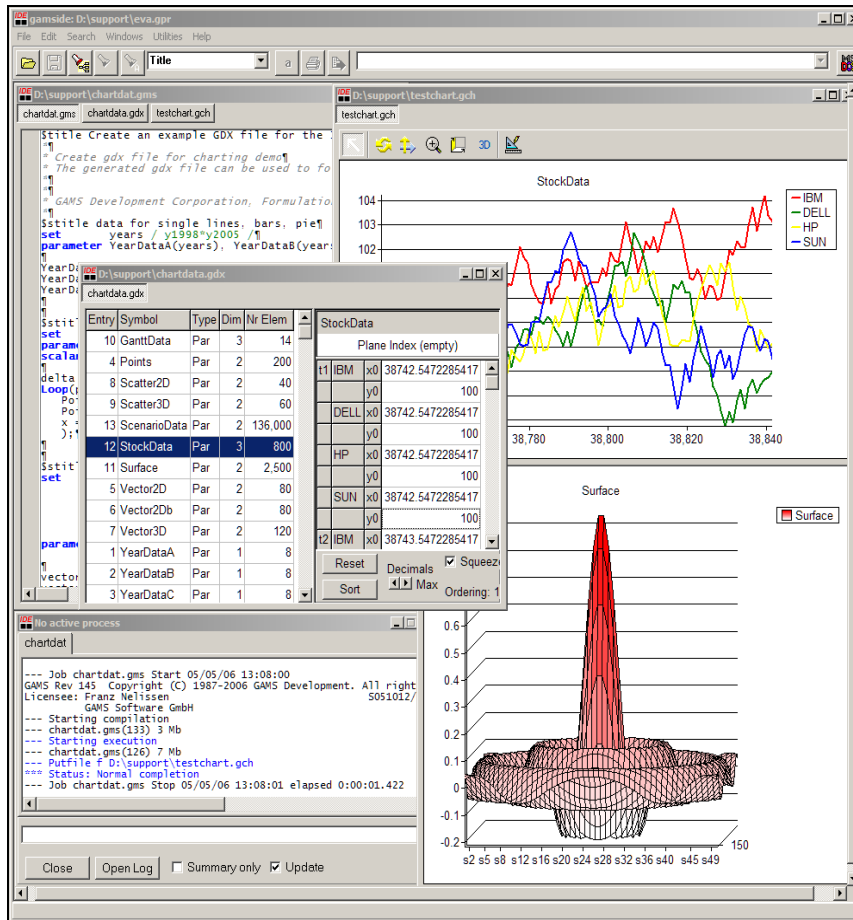
EURO XXIV LISBON



GAMS at a Glance

General Algebraic Modeling System

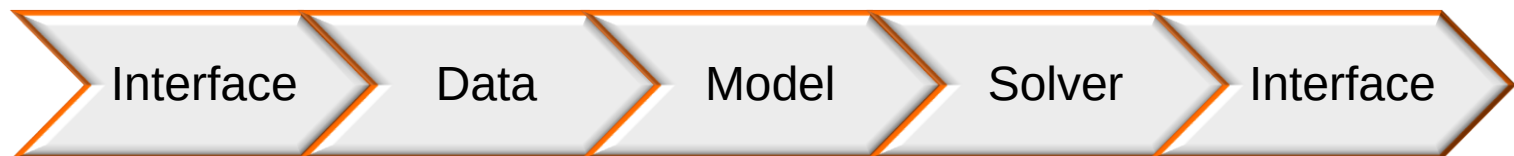
- Roots: World Bank, 1976
- Went commercial in 1987
- GAMS Development Corp.
- GAMS Software GmbH
- Broad academic & commercial user community and network





GAMS' Fundamental concepts

- **Platform independence**
- **Open architecture and interfaces to other systems**
- **Balanced mix of declarative and procedural elements**
 - Declaration of Sets, Parameters, Variables, Equations, Models, ...
 - Procedural Elements like loops, if-then-else, ...
- **Layers of separation**





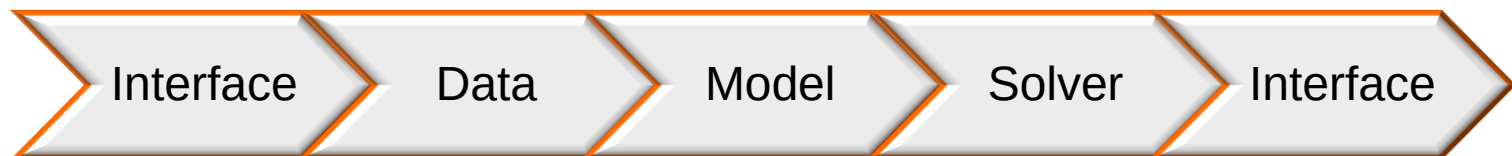
GAMS' Fundamental concepts

- **Different layers with separation of**

- model and data
- model and solution methods
- model and operating system
- model and interface

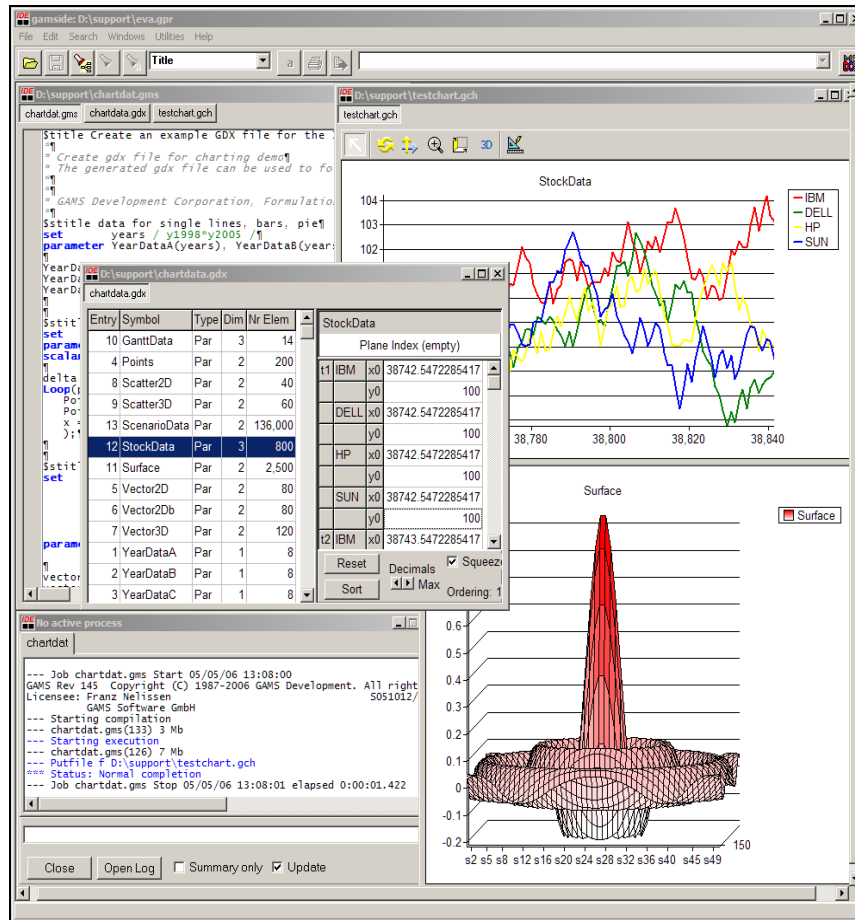
→ **Models benefit from**

- advancing hardware
- enhanced / new solver technology
- improved / upcoming interfaces to other systems





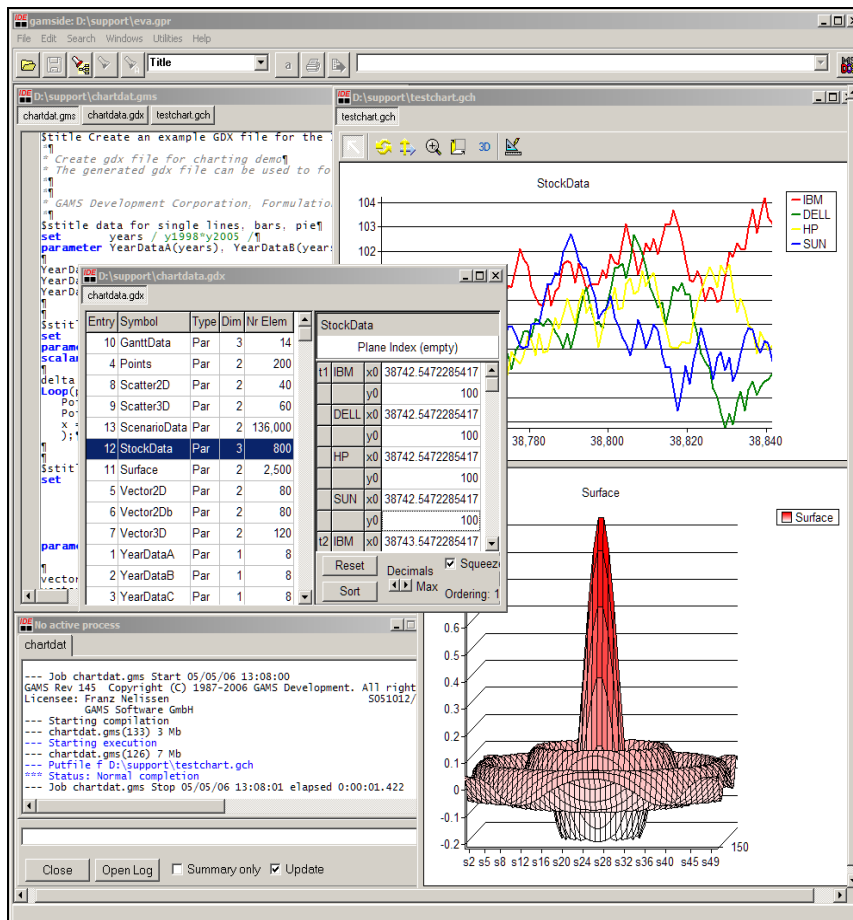
GAMS at a Glance



General Algebraic Modeling System

- Algebraic Modeling Language
- 25+ Integrated Solvers
- 10+ Supported MP classes
- 10+ Supported Platforms
- Connectivity- & Productivity Tools
 - IDE
 - Model Libraries
 - GDX, Interfaces & Tools
 - Grid Computing
 - Benchmarking
 - Compression & Encryption
 - Deployment System
 - ...

GAMS at a Glance



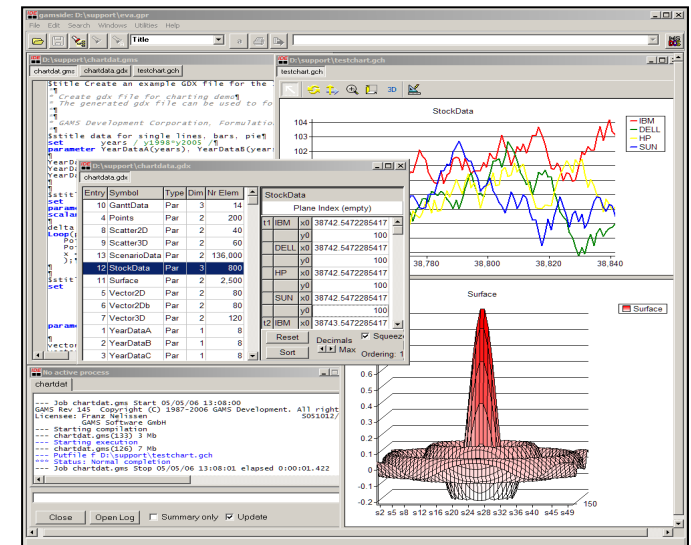
The GAMS/BASE Module

- Compiler and Execution System
- GAMS IDE (Windows)
- Documentation + Model libraries
- GDX Utilities
- Free Solvers/Solver Links



Integrated Development Environment

- Project management
- Editor / Syntax coloring / Spell checking
- Launching and monitoring of (multiple) GAMS processes
- Listing file / Tree view / Syntax-error navigation
- Solver selection / Option selection
- GDX viewer
 - Data cube
 - Data export (e.g. to MS Excel)
 - Charting facilities
- Model libraries
- Documentation





Documentation

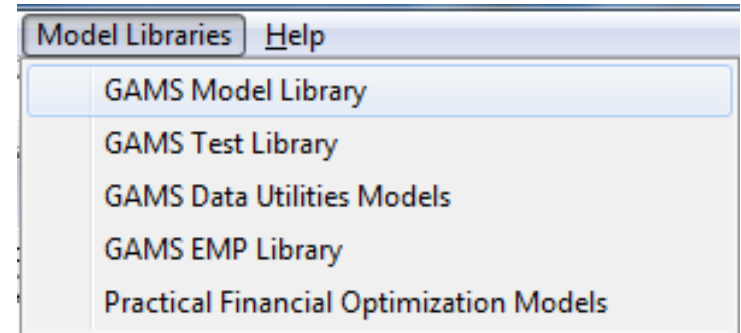
- **Distributed Documentation**
 - GAMS Users Guide
 - Expanded GAMS Users Guide (McCarl)
 - Solver Manuals
 - GAMS Utility Manuals
- **Wikis**
 - Support Wiki <http://support.gams-software.com>
 - Interfaces Wiki <http://interfaces.gams-software.com>
- **Search all GAMS Websites**
<http://www.gams.com/search.htm>



Distributed Model Libraries

- **GAMS Model Library**

- Example and user-contributed models
- Very often used as templates
- Tests for
 - Solver robustness and correctness
 - Backward compatibility



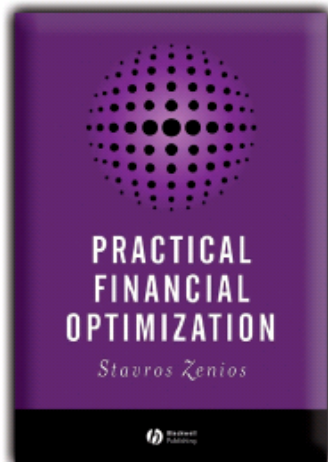
- **GAMS Test Library**

- Transparent and reproducible Quality Assurance Tests
- Tests for
 - Solver correctness
 - Special functions
 - GAMS utilities



Distributed Model Libraries

- **GAMS Data Utilities Library**
 - Demonstration of the various utilities interfacing GAMS with other applications
 - E.g. gdxxrw, mdb2gms, sql2gms
- **GAMS EMP Library**
 - Examples for the use of Extended Mathematical Programming



- **Practical Financial Optimization Models**
Models of the book

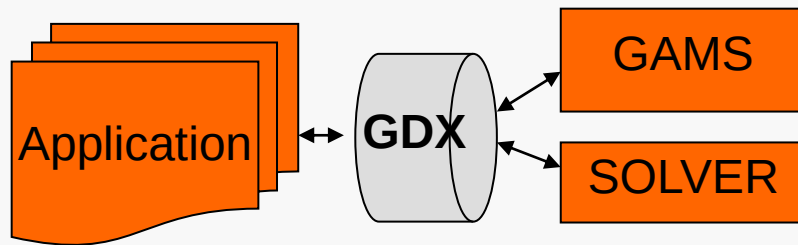
*“PRACTICAL FINANCIAL OPTIMIZATION –
A Library of GAMS Models”*

by Consiglio, Nielsen and Zenios



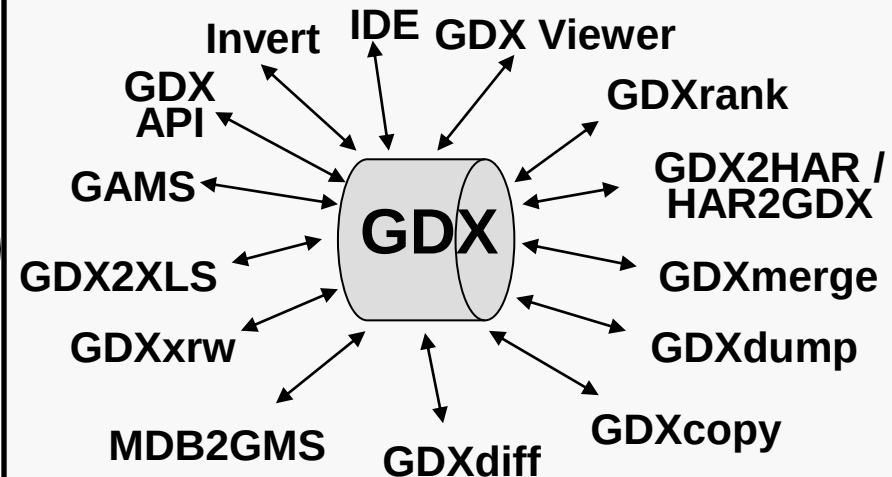
Gams Data eXchange

Binary Data Exchange

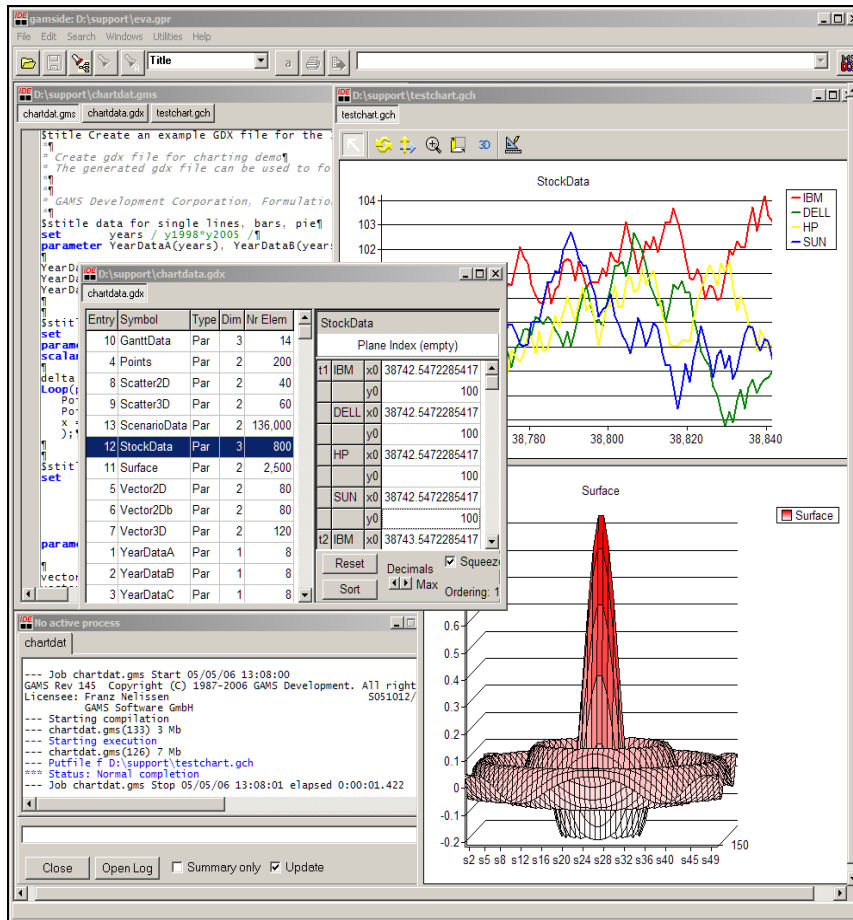


- Fast exchange of data
- Syntactical check on data before model starts
- Data Exchange at any stage (Compile and Run-time)
- Platform Independent
- Direct GDX interfaces and general API
- Scenario Management Support
- Full Support of Batch Runs

GDX Tools



GAMS at a Glance



The GAMS/BASE Module

Free Solvers

- Convert
- EMP/JAMS, LOGMIP, NLPEC
- BENCH, EXAMINER, GAMSCHK
- BDMLP, LS, and MILES
- COIN-OR
Cbc, IpOpt, BonMin, Couenne
- Glpk, Scip (academic only)



New GAMS Distribution 23.5

Released July, 4th !

www.gams.com/download

[\[Home \]](#) | [\[Support \]](#) | [\[Sales \]](#) | [\[Solvers \]](#) | [\[Documentation \]](#) | [\[Model Libraries \]](#) | [\[Search \]](#) | [\[Contact Us \]](#)

Download GAMS Distribution 23.5.1 - July 4, 2010

Note: To deliver GAMS with the best performance we are using the [Amazon CloudFront](#) web service, a global network of edge locations for content delivery.

Please consult the [release notes](#) before downloading a system. The installation notes for [Windows](#) and [UNIX](#) and the complete [system documentation](#) are included in any system.

Windows	
Windows 32 bit	Windows 7, Windows Vista, Windows XP, Windows Server 2008, Windows Server 2003, and compatible on AMD- or Intel-based (x86_32) architectures
Windows 64 bit	Windows 7 x64, Windows Vista x64, Windows XP x64, Windows Server 2008 x64, Windows Server 2003 x64, and compatible on AMD- or Intel-based (x64_64) architectures.
Unix	
AIX	AIX 5.3 or higher, PowerPC chip, 64 bit (ppc_64)
Digital UNIX	Digital Unix 4 or higher on DEC Alpha (asp_64). Please note that the current GAMS distribution for Digital Unix is 22.7
HP-UX	HP-UX 11 or higher on HP PA-RISC (hpux_32). Please note that the current GAMS distribution for HP-UX is 22.1
Linux 32 bit	AMD- or Intel-based (x86_32) Intel-based 32-bit Linux systems. Most likely, these will have a 2.4.X kernel or higher. The software was built with Intel's Linux compilers, ver 11.1 or higher.
Linux 64 bit	AMD- or Intel-based (x64_64) Linux systems. These were built on a 2.6 kernel with Intel's Linux compilers, ver 11.1 or higher.
IRIX	IRIX 6.2 or higher on SGI MIPS (sgi_32). Please note that the current GAMS distribution for IRIX is 22.3
Mac OS X Intel 32 bit	Macintosh Intel-based systems (x86_32) built on Darwin 9. Please note that this is a Mac OS X Terminal application and must be installed and executed using the command line interface. → Additional Information
Mac OS X Intel 64 bit	Macintosh Intel-based systems (x64_64) built on Darwin 9. Please note that this is a Mac OS X Terminal application and must be installed and executed using the command line interface. Additional Information
Mac OS X PPC	Macintosh PowerPC-based systems for G4/G5 processors (ppc_fat) built on Darwin 8.4. Please note that the current GAMS distribution for Mac OS X PPC is 23.3.3 and that this is a Mac OS X Terminal application and must be installed and executed using the command line interface. Additional Information
Solaris SPARC 32 bit	Solaris 2.8 or higher on SUN Sparc (sparc_32). Missing Fortran Run-Time Environment?
Solaris SPARC 64 bit	Solaris 2.8 or higher on SUN Sparc (sparc_64)
Solaris x64 64 bit	Solaris 10 or higher on AMD- or Intel-based 64-bit (x64_64)

Please also visit the information about the [distribution history, changes, and incremental updates](#). For older distributions please follow [this link](#). There are some [mailing lists](#), which will inform you about



New GAMS Distribution 23.5 cont'd

– Solver updates

- BARON 9.0.6
- CPLEX 12.2
- GUROBI 3.0.1
- LINDOGLOBAL 6.1.1
- MOSEK 6
- SCIP 1.2
- XPRESS 20.00
- Coin-OR

(CBC 2.4, Bonmin 1.3, Couenne 0.3, Ipopt 3.8, Glpk 4.43, OS 2.1)

– New platforms

- 64bit Intel Mac
- 64bit AIX



New GAMS Distribution 23.5 cont'd

Solver/Platform availability - 23.5 July 4, 2010														
	x86 MS Windows	x86_64 MS Windows	x86 Linux	x86_64 Linux	Sun Sparc SOLARIS	Sun Sparc64 SOLARIS	Sun Intel SOLARIS	IBM RS-6000 AIX 5.3	Mac Intel32 Darwin	Mac x86_64 Darwin	HP 9000 HP-UX 11 ¹	SGI IRIX ²	DEC Alpha Digital Unix 4.0 ³	Mac PowerPC Darwin ⁴
ALPHAECF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
BARON 9.0	✓	✓	✓	✓										
BDMLP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
COIN-OR	✓	✓	✓	✓			✓		✓	✓				
CONOPT 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CPLEX 12.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10.0	9.1	8.1	
DECIS	✓	✓	✓	✓	✓	32bit					✓	✓	✓	
DICOPT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
GUROBI 3.0	✓	✓	✓	✓						✓				
KNITRO 6.0	✓	✓	✓	✓	5.2	32bit			✓					
LINDOGLOBAL 6.1	✓	✓	✓	✓	6.0	6.0	✓		✓	✓				✓
LGO	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
MILES	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MINOS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MOSEK 6	✓	✓	✓	✓	5.0	5.0	✓		✓	✓	3.2			
MPSGE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MSNLP	✓	✓	✓	✓	✓	32bit			✓	✓	✓			
NLPEC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OQNLP	✓	32bit	✓	32bit										
PATH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SBB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SCIP	✓	✓	✓	✓			✓		✓	✓				
SNOPT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
XA	✓	32bit	✓	✓	✓	32bit					✓		✓	✓
XPRESS 20.00	✓	✓	✓	✓	✓	✓	✓	✓			16.10			



New GAMS Distribution 23.5 cont'd

- Free Coin-OR OSI-based links to CPLEX, GUROBI, MOSEK and XPRESS
- GAMS on Amazon EC2
- **GAMS API's**
 - Improvements on all frontiers
 - Now supported: Python
 - Examples/Documentation
 - Project and configuration files
- ...



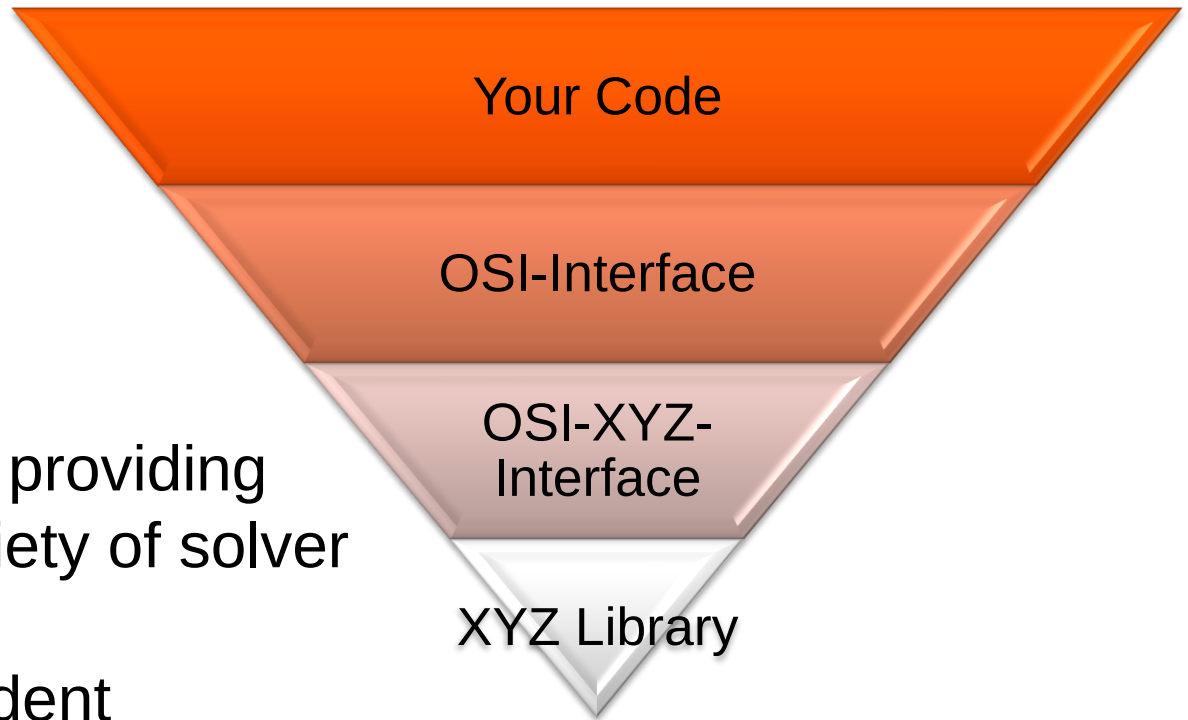
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Open Solver Interface-based links

- A standard API providing access to a variety of solver
- Solver independent



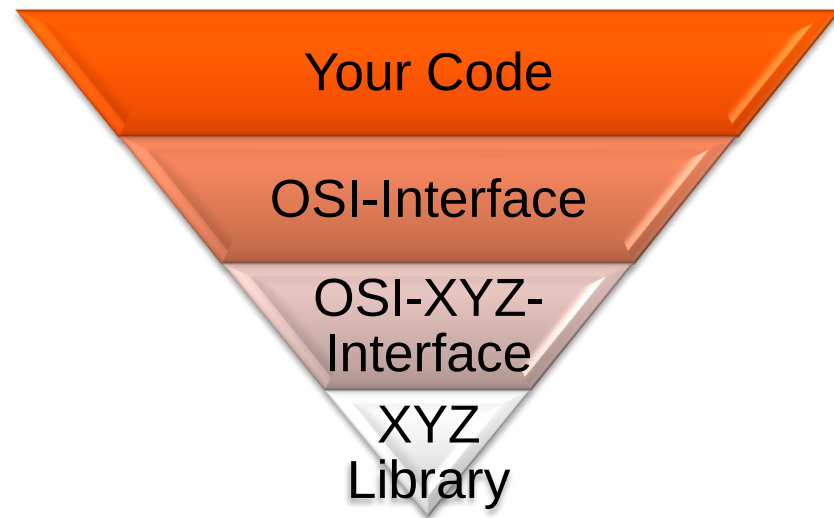
<http://projects.coin-or.org/Osi>



Open Solver Interface-based links

GAMS base includes
OSI-based links to

- CPLEX
- GUROBI
- MOSEK
- XPRESS



→ Free, yet, it does not support all features of a real GAMS solver link (LP/MIP only!)

→ !!! **Require a valid solver license** !!!



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GAMS on Amazon EC2

- **Amazon Elastic Compute Cloud**
 - *Unlimited* computing resources available on demand
 - Pay by the hour
 - No up-front commitment
- **Pre-configured Instances with GAMS base available**
 - Immediate access with no IT investment/management
 - Pay-as-you-go: No reservation, no long term contracts
 - Full access to Windows (rdp) or Unix (ssh)
 - 64 bit environment, 15 GB of RAM and 4 cores



GAMS on Amazon EC2 cont'd

The screenshot displays the Amazon EC2 console interface. The top navigation bar shows 'Home > Resources > AWS Management Console > AWS > Amazon EC2'. The left sidebar contains a 'Navigation' menu with options like 'EC2 Dashboard', 'INSTANCES', 'IMAGES', 'AMIs', 'Bundle Tasks', 'ELASTIC BLOCK STORE', 'Volumes', 'Snapshots', 'NETWORKING & SECURITY', 'Elastic IPs', 'Security Groups', and 'Key Pairs'. The main content area is titled 'Amazon EC2 Console Dashboard' and includes a 'Getting Started' section with a 'Launch Instances' button. A 'My Resources' section shows '3 Running Instances' and '2 Elastic IPs'. A 'Service Health' section indicates 'Amazon EC2 (US) Service is operating normally'. Below the console, a pricing calculator for 'GAMS System on Demand' is shown, with a table listing instance types and prices.

Instance	Your Price (\$)	Details
Amazon EC2 running Windows Box Usage	Small	0.13 per hour (or partial hour) consumed

By clicking the 'Place your Order' button, you indicate that you have read and agree to the [Billing Services Agreement](#).

More information at:

<http://www.gams.com/aws>



GAMS on Amazon EC2 cont'd

We use Amazon instances ourselves

- Nightly system builds
- Nightly quality assurance tests using our public test libraries

Latest GAMS System Builds and Test Results										Monday 14Jun10 16:23 (UTC)
[Latest Builds Alpha Builds Beta Builds Nightly Builds System Codes History]										Comments
nightly a	System	Libraries	Build	Rev	Status and Time (UTC)	Initial Tests	Full Tests			
Friday	lnx	Download	23.6.0	18017	Test done 12Jun2010 02:07:32	420 runs 0 failures (q=0,s=0)	Report 1036 runs 6 failures (q=6,s=0)	Report		
Friday	ix8	Download	23.6.0	18017	Test done 12Jun2010 02:06:41	425 runs 1 failures (q=0,s=0)	Report 1058 runs 6 failures (q=6,s=0)	Report		
Friday	vs8	Download	23.6.0	18019	Test done 14Jun2010 08:39:31	444 runs 1 failures (q=0,s=0)	Report 9016 runs 25 failures (q=8,s=17)	Report		
Friday	wei	Download	23.6.0	18022	Test done 13Jun2010 20:55:24	425 runs 2 failures (q=1,s=1)	Report 7630 runs 76 failures (q=11,s=65)	Report		
nightly b	System	Libraries	Build	Rev	Status and Time (UTC)	Initial Tests	Full Tests			
Friday	lnx	Download	23.5.0	18021	Test started 12Jun2010 01:55:30	543 runs 0 failures (q=0,s=0)	Report results pending			
Thursday	ix8	Download	23.4.3	17848	Test done 28May2010 06:59:06	529 runs 0 failures (q=0,s=0)	Report 9435 runs 0 failures (q=0,s=0)	Report		
Thursday	vs8	Download	23.4.3	17852	Test done 28May2010 16:42:04	508 runs 0 failures (q=0,s=0)	Report 8424 runs 0 failures (q=0,s=0)	Report		
Wednesday	wei	Download	23.4.3	17812	Test done 27May2010 14:27:23	488 runs 2 failures (q=2,s=0)	Report 7539 runs 1 failures (q=1,s=0)	Report		
alpha	System	Libraries	Build	Rev	Status and Time (UTC)	Initial Tests	Full Tests			
20100408	aix	Download	23.4.0	16862	Test done 09Apr2010 06:29:24	290 runs 0 failures (q=0,s=0)	Report 2893 runs 1 failures (q=1,s=0)	Report		
20100408	deu	Download	23.4.0	16862	Test done 09Apr2010 01:45:46	406 runs 0 failures (q=0,s=0)	Report 5301 runs 1 failures (q=1,s=0)	Report		
20100408	diu	Download	23.4.0	16878	Test done 09Apr2010 16:46:57	410 runs 7 failures (q=0,s=7)	Report 5685 runs 99 failures (q=32,s=67)	Report		
20100408	leu	Download	23.4.0	16862	Test done 09Apr2010 09:29:57	520 runs 0 failures (q=0,s=0)	Report 8954 runs 2 failures (q=2,s=0)	Report		
20100408	lei	Download	23.4.0	16862	Test done 09Apr2010 04:55:44	526 runs 0 failures (q=0,s=0)	Report 9397 runs 1 failures (q=1,s=0)	Report		
20100408	lnx	Download	23.4.0	16862	Test done 12Apr2010 13:04:53	520 runs 0 failures (q=0,s=0)	Report 8955 runs 3 failures (q=3,s=0)	Report		
20100408	ix8	Download	23.4.0	16862	Test done 09Apr2010 05:58:20	526 runs 0 failures (q=0,s=0)	Report 9408 runs 1 failures (q=1,s=0)	Report		
20100408	siu	Download	23.4.0	16862	Test done 09Apr2010 03:08:14	422 runs 2 failures (q=2,s=0)	Report 5511 runs 4 failures (q=4,s=0)	Report		
20100408	sol	Download	23.4.0	16862	Test done 09Apr2010 11:25:37	364 runs 2 failures (q=2,s=0)	Report 4549 runs 2 failures (q=2,s=0)	Report		
20100408	sox	Download	23.4.0	16878	Test done 10Apr2010 00:26:13	363 runs 0 failures (q=0,s=0)	Report 4548 runs 0 failures (q=0,s=0)	Report		
20100408	vs8	Download	23.4.0	16862	Test done 10Apr2010 08:52:08	526 runs 2 failures (q=0,s=1)	Report 9406 runs 18 failures (q=6,s=12)	Report		
20100408	wei	Download	23.4.0	16878	Test done 10Apr2010 14:21:48	525 runs 1 failures (q=0,s=1)	Report 9404 runs 29 failures (q=5,s=24)	Report		
20100408	leiONubuntu64	---	23.4.0	---	Test done 09Apr2010 23:12:26	525 runs 0 failures (q=0,s=0)	Report 9397 runs 3 failures (q=3,s=0)	Report		
20100408	ix3ONubuntu32	---	23.4.0	---	Test done 09Apr2010 15:45:16	525 runs 1 failures (q=1,s=0)	Report 9408 runs 3 failures (q=3,s=0)	Report		
20100408	ix3ONubuntu64	---	23.4.0	---	Test done 09Apr2010 18:52:21	525 runs 1 failures (q=1,s=0)	Report 9408 runs 5 failures (q=5,s=0)	Report		
20100408	vs8ONmonte	---	23.4.0	---	Test done 10Apr2010 00:35:59	525 runs 0 failures (q=0,s=0)	Report 9406 runs 1 failures (q=1,s=0)	Report		
20100408	vs8ONtoyvista	---	23.4.0	---	Test done 13Apr2010 03:54:22	525 runs 0 failures (q=0,s=0)	Report 9406 runs 2 failures (q=1,s=1)	Report		
20100408	vs8ONtoysxp	---	23.4.0	---	Test done 13Apr2010 12:18:16	525 runs 0 failures (q=0,s=0)	Report 9406 runs 2 failures (q=2,s=0)	Report		



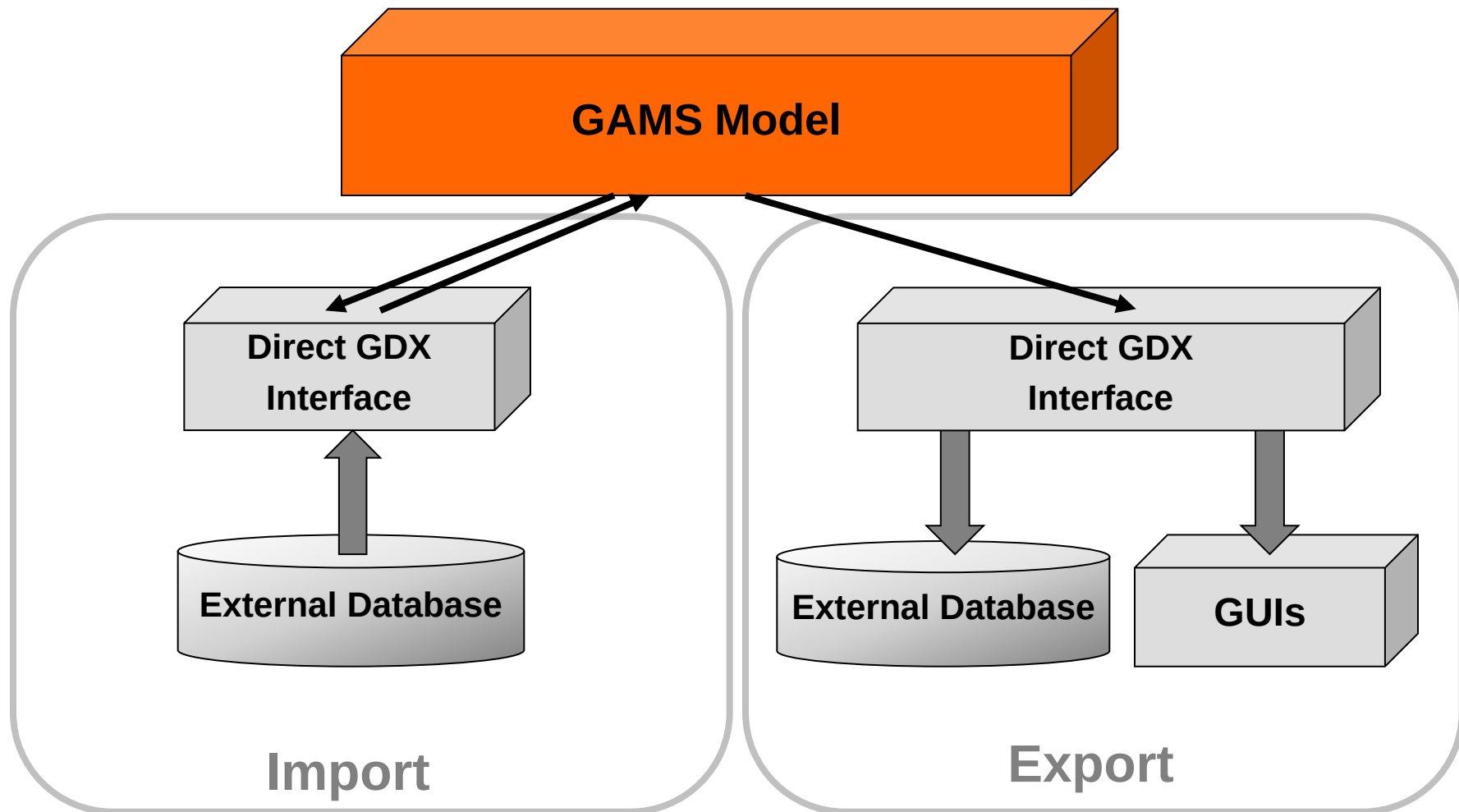
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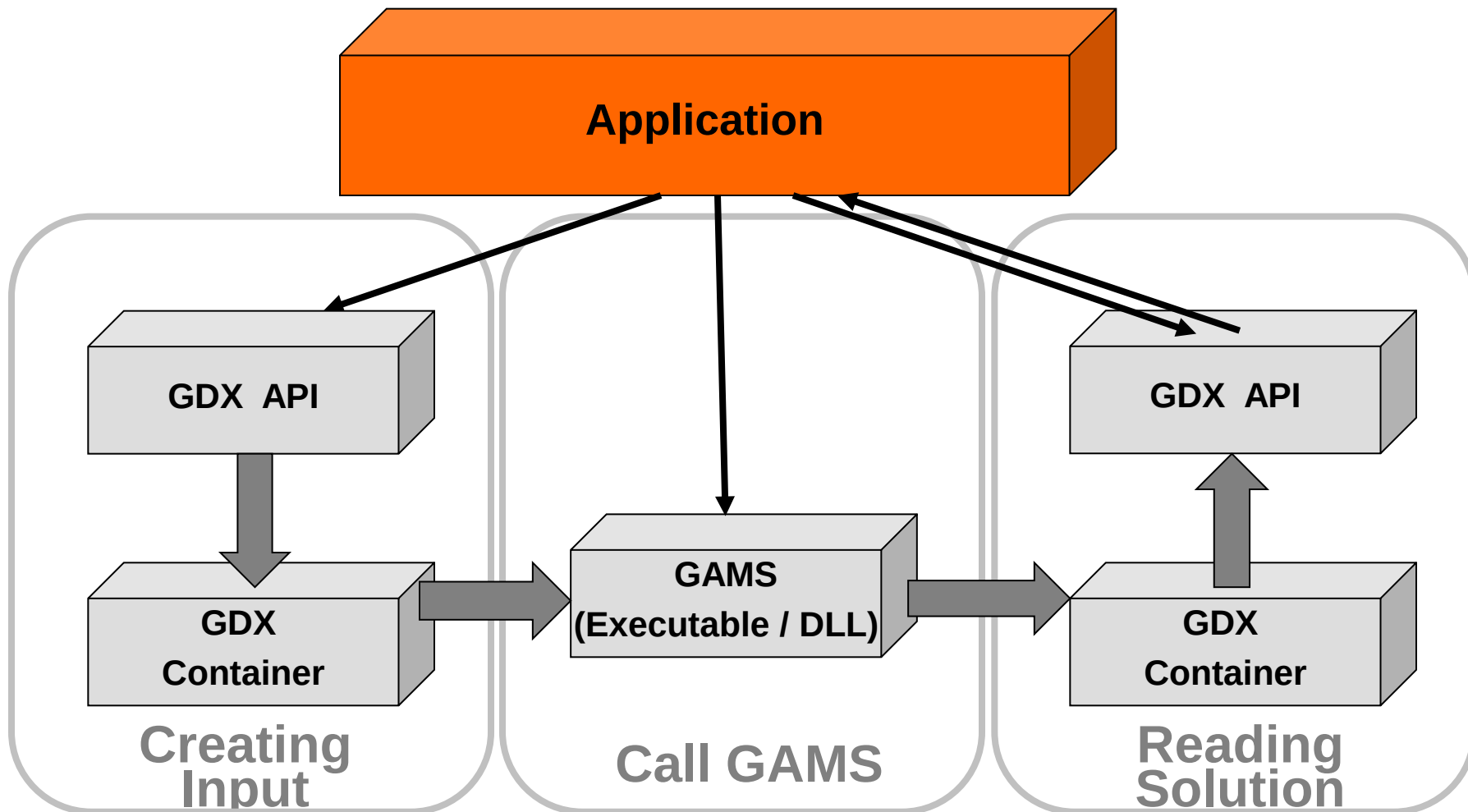


Interfacing: GAMS in Control





Interfacing: Application in Control





GAMS Application Programming Interfaces

GAMS in Control

VS.

Application in Control

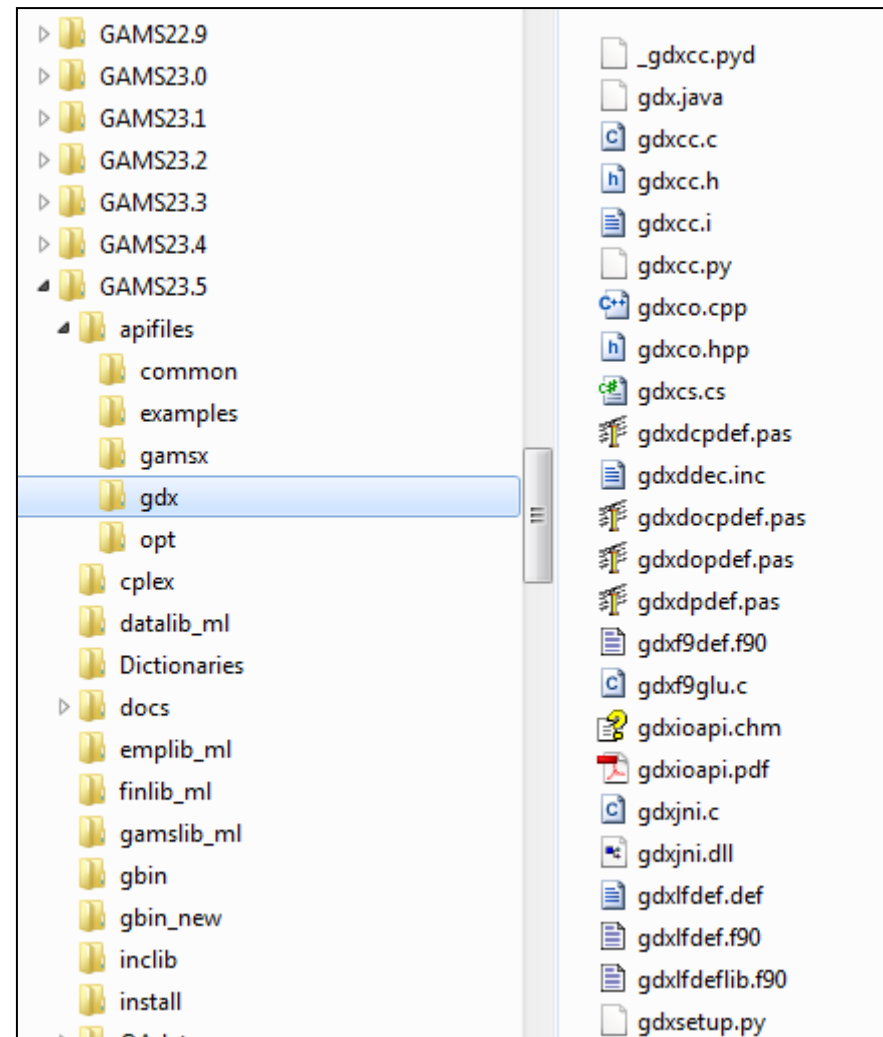


- Need to support a variety of applications
 - Web application (server side)
 - Application Builder
 - Oracle, Eclipse, .NET, ...
 - Regular Programming language C(++), C#, Java, VB, Fortran, Python, ...
 - MS Office Application / VBA



Distributed GAMS APIs

- Component Libraries
 - GAMS
 - GDX
 - Option
- Supported languages
 - C, C++, C#
 - Delphi
 - Fortran
 - Java
 - VBA, VB.Net
 - Python
- Examples/Documentation





Calling GAMS from your Application

Creating Input for GAMS Model

→ Data handling using **GDX** API

Callout to GAMS

→ GAMS option settings using **Option** API

→ Starting GAMS using **GAMS** API

Reading Solution from GAMS Model

→ Data handling using **GDX** API



Calling GAMS from Python

```

if __name__ == "__main__":
    numberParams = len(sys.argv)
    if numberParams != 2 :
        print "Usage:", sys.argv[0], "sysDir"
        os._exit(1)

   .gdxHandle = new_gdxHandle_tp()
    .optHandle = new_optHandle_tp()
    .gamsxHandle = new_gamsxHandle_tp()

    sysDir = sys.argv[1]
    print sys.argv[0], "using GAMS system directory:", sys.argv[1]

    assert gamsxCreated(gamsxHandle, sysDir, GMS_SSSIZE)[0]
    assert gdxCreated (.gdxHandle, sysDir, GMS_SSSIZE)[0]
    assert optCreated (.optHandle, sysDir, GMS_SSSIZE)[0]

    status = writeModelData(gdxHandle, "demanddata.gdx")
    if not status:
        print("Model data not written")
        terminate(gdxHandle, gamsxHandle, optHandle)

    status = callGams(gamsxHandle, optHandle, sysDir)
    if not status:
        print("Call to GAMS failed")
        terminate(gdxHandle, gamsxHandle, optHandle)

    status = readSolutionData(gdxHandle, "results.gdx")
    if not status:
        print("Could not read solution back")

    terminate(gdxHandle, gamsxHandle, optHandle)

```

```

from gdxcc import *
from gamsxcc import *
from optcc import *
import sys
import os

```

Creating Input for GAMS Model

Callout to GAMS

Reading Solution from GAMS Model



Calling GAMS from Python cont'd

Creating Input for GAMS Model

```
def writeModelData(gdxHandle, fngdxfile):
    ret, errNr =.gdxOpenWrite(gdxHandle, fngdxfile, "Example1")
    if errNr:
        print "*** Error.gdxOpenWrite: " +.gdxErrorStr(gdxHandle, errNr)[1]
        return False

    if not.gdxDataWriteStrStart(gdxHandle, "Demand", "Demand data", 1, GMS_DT_PAR, 0):
        reportGDSError(gdxHandle, "DataWriteStrStart")

    values = doubleArray(GMS_VAL_MAX)
    values[GMS_VAL_LEVEL] = 324.0
   .gdxDataWriteStr(gdxHandle, ["New-York"], values)
    values[GMS_VAL_LEVEL] = 299.0
   .gdxDataWriteStr(gdxHandle, ["Chicago"], values)
    values[GMS_VAL_LEVEL] = 274.0
   .gdxDataWriteStr(gdxHandle, ["Topeka"], values)

    if not.gdxDataWriteDone(gdxHandle):
        reportGDSError(gdxHandle, "WriteData")

    errNr =.gdxGetLastError(gdxHandle)
    if errNr:
        print "*** Error while writing GDX File: " +.gdxErrorStr(gdxHandle, errNr)[1]
        return False

    errNr =.gdxClose(gdxHandle)
    if errNr:
        print "*** Error.gdxClose: " +.gdxErrorStr(gdxHandle, errNr)[1]
        return False

    return True
```




Calling GAMS from Python cont'd

Callout to GAMS

```
- def callGams(gamsxHandle, optHandle, sysDir):  
...     deffile = sysDir + "\\optgams.def"  
...  
...     if optReadDefinition(optHandle, deffile):  
...         print "*** Error ReadDefinition, cannot read def file:" + deffile  
...         return False  
...  
...     optSetStrStr(optHandle, "SysDir", sysDir)  
...     optSetStrStr(optHandle, "Input", "model2.gms")  
...     optSetIntStr(optHandle, "LogOption", 3)  
...     ret = gamsxRunExecDLL(gamsxHandle, optHandleToPtr(optHandle), sysDir, 1)  
-     if ret[0] != 0:  
...         print "*** Error RunExecDLL: Error in GAMS call = " + str(ret[1])  
...         return False  
...  
...     return True
```



Calling GAMS from Python cont'd

Reading Solution from GAMS Model

```
def readSolutionData(gdxHandle, fngdxfile):
    errNr = gdxOpenRead(gdxHandle, fngdxfile)[1]
    if errNr:
        print "**** Error OpenRead: " + gdxErrorStr(gdxHandle, errNr)[1]
        return False

    ret, varNr = gdxFindSymbol(gdxHandle, "result")
    if not ret:
        print "*** Error FindSymbol: Could not find variable result"
        return False

    ret, symName, dim, varType = gdxSymbolInfo(gdxHandle, varNr)
    if dim != 2 or varType != GMS_DT_VAR:
        print "**** Error SymbolInfo: result is not a two dimensional variable"
        return False

    ret, nrRecs = gdxDataReadStrStart(gdxHandle, varNr)
    if not ret:
        reportGDSError(gdxHandle, "DataReadStrStart")
        return False

    ...
```



Calling GAMS from Excel (VBA)

chp2.xls [Compatibility Mode] - Microsoft Excel

Home Insert Page Layout Formulas Data Review View

Paste Cut Copy Format Painter Clipboard

Calibri 11 Font

Wrap Text Alignment

General Number

Conditional Formatting Styles

Format as Table Styles

Cell Styles

Insert Delete Format Cells

AutoSum Fill Clear Sort & Find & Filter Select Editing

AF40

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1		SG	SG	HTB	GT	GT	HRB	HE	HB	ST	HC												
2		0	1	1	0	1	1	1	1	1	1												
3	Gas			-39.6	-54.69	-85.67																	
4	Coal	-17.62	-35.24																				
5	WasteHeat				36.43	53.2	-42.56	-10.64	-53.2														
6	Steam	5.5	11				10.72			-16.7													
7	Exhaust									16.7	-16.7												
8	Heat			18				8.6184			39.84												
9	Electricity	-0.25	-0.5		13.77	29.55				10.39													
10																							
11																							
12																							
13																							
14																							
15																							
16																							
17																							
18																							
19	GAMS Directory:	c:\program files\GAMS23.5\																					
20	Working Directory:	c:\tmp\																					
21	Solver:	CPLEX																					
22																							
23																							
24																							
25																							
26																							
27																							

SOLVE **Clear Solution**

Solution - Generated Heat & Electricity

Solver: CPLEX
 Equations: 14786 Variables: 19489
 Model Status: 8 Integer Solution
 Solver Status: 1 Normal Completion
 Iterations: 8704 Solve Time: 0.50

 Objective Value: 834036
 No. of Hours GT is ON: 530
 No. of GT Starts: 8



How to keep Up To Date

<http://www.gams.com/maillist/>

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GAMS users worldwide use the list name GAMS-L to exchange information about GAMS. GAMS-L is open to everyone around the world and can easily be reached via the Internet.

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Bruce McCarl's GAMS Newsletter

With his newsletter Bruce McCarl wants to provide some additional information on the use and features which emerge as GAMS develops. He intends to periodically issue a very short newsletter that informs people of things that are new and or under documented as well as opportunities to learn more about GAMS features and usage.

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Please visit us at our booth in Building C6 !



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