

# Index

## A

accounting and/vs. monitoring 187  
 accounting procedures 185  
 accounting sensors 185  
 adaptive resource management (ARM) 110  
 adaptive resource management in grid environment 109–117  
 agent-based resource management system (ARMS) 124, 318  
 AMR 15, 16, 17, 20, 339  
 analogue terrestrial transmission (ATT) 138  
 ant colony optimization 120, 125, 335  
 AntHill framework 122  
 APA 26, 27, 28  
 API 262, 265, 268  
 AppDB 25, 26, 27  
 application aware scheduling 255  
 application performance database (AppDB) 25  
 application profiling and analysis (APA) 26  
 application profiling system 23, 26  
 application profiling system (APS) 26  
 application programming interface (API) 262  
 application specification language (ASL) 26  
 archive, retrieving a file 141  
 archive, storing a file 141  
 ARM 109, 112, 113, 114, 115  
 ARMS 120, 121, 124, 318  
 ASL 26, 27, 29, 312  
 asynchronous 53  
 auction 85, 86, 87, 88, 89, 90, 91, 318, 93, 94, 95, 96, 97, 325, 328, 329, 335, 338, 96  
 auctioneers in the grid economy 88  
 auction taxonomy 90

## B

BaBar experiment 226, 227, 233, 323  
 BADFS 44  
 basic local alignment search tool (BLAST) 209  
 batch-aware distributed file system (BADFS) 44  
 Bayesian estimation of phylogeny 210  
 BEgrid 196, 198, 199, 200, 201, 202, 203, 204  
 Beowulf 196, 203, 204, 326  
 BI-GIS 261, 268  
 BIOGRID 295  
 BIOGRID architecture 295  
 bio-inspired grid resource management 118–125  
 biomedical informatics 157  
 biometric 270, 272, 273, 274, 275, 276, 278, 333  
 Blackboard 219, 221, 224, 322  
 black box 88, 90  
 BLAST 208, 209, 210, 213, 216, 217, 218, 313, 314, 341  
 broker 85, 86, 90, 96, 197, 198, 199, 200, 201

## C

CAP 86, 87, 93  
 CDDLM 304  
 CEs 198  
 CGC 275, 276  
 charge and parity (CP) symmetry 227  
 ChinaGrid support platform 305  
 ChinaGrid support platform, dynamic maintenance 303–311  
 Chord 153, 155, 340  
 cloud computing 167  
 cluster computing 148  
 CNGrid 8, 298, 299

CoBRA 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 327  
combating 270, 271, 277  
combating global terrorism, world wide grid 269–280  
combinatorial allocation problem (CAP) 86  
commodity market 172, 173, 174, 175, 176, 177, 178, 179, 181, 340, 342  
complex adaptive systems (CAS) 119  
computational economy 189, 193  
computational grid 31, 32, 33, 34, 37, 38, 39, 40, 322, 344  
computer element (CE) 198, 228  
configuration, description, deployment and lifecycle management (CDDLM) 304  
consistency of replicated datasets 49–58  
cooperative services 235, 238  
counter-terrorism 270, 271, 273, 274, 279, 337  
counterterrorist grid collaboratories (CGC) 275  
CPU-oriented schedulers 41, 43

**D**

data access layer 282, 284, 285, 288  
data-aware distributed batch scheduling 41–48  
data-aware distributed computing 43  
data-aware schedulers 41, 43, 44, 48, 329  
data-aware scheduler, Stork 44  
data-aware storage systems 44  
database consistency 54  
database system 262  
data grid portal 100  
data management system (DMS) 282  
data placement 41, 43, 44, 45, 46, 47, 48, 330  
data replication 50  
dedicated environment 60  
DEISA 8  
design space exploration 250, 252, 255  
digital archive 283  
digital satellite transmission (DSAT) 138  
digital terrestrial transmission (DTT) 138  
distributed and self-organizing resource management (DSRM) 123  
distributed cooperative enterprise 235, 238  
distributed image processing, Blackboard system 219–225  
distributed wireless transport grid systems (DWTGS) 275  
DMS 282, 283  
docking 209, 211, 218  
DSRM 120, 123, 124  
DUAGC 276

DWTGS 275, 276  
dynamic load balancing 15  
dynamic ubiquitous and autonomic grid computing (DUAGC) 276

**E**

economic scheduling 183, 184, 189  
EELA applications 215  
EGEE 8, 99, 106, 198, 203, 204, 281, 282, 288, 289, 318, 321, 322, 326  
EGM 274  
e-infrastructure 248, 330  
electrical power grid 2  
emergent behavior in nature 119  
end-to-end QoS provision 75, 76, 77, 79, 80  
enhanced integrated drive electronics (EIDE) 129  
e-science 235, 236, 237, 238, 316  
European Production Grid (EGEE) 99  
excess demand 173, 174, 175  
extended grid middleware (EGM) 274

**F**

fault tolerance 18  
fiber channel (FC) 129  
file system 262  
flat files 49, 51, 52  
front-end approach 99, 100

**G**

Garuda 293, 294, 295, 298, 299, 300, 325  
GARUDA architecture 294  
GATE 208, 209, 211, 215, 216, 217, 218, 245, 328  
GEANT4 208, 215, 216, 217, 218, 312, 314  
GEMS 246  
genetic algorithm 136, 142, 143, 144, 145, 326, 331  
GENIUS 244, 247, 248, 314, 325  
geographic information system (GIS) grids 259  
GES 174, 176  
GGG 3, 4, 5  
GILDA 241, 242, 314, 243, 244, 246, 247, 248, 325  
GILDA tutorials 243  
GILDA wiki website 243  
GIS 259, 260, 261, 315, 262, 264, 265, 266, 267, 268, 329, 333, 339, 342, 273  
GIS data, business use 259–268  
GIS essence 264  
GIS grids 259–268  
gLite 242, 244, 248, 282, 287, 289, 321, 323, 326  
gLite middleware 207, 228, 232  
Globus 198, 203, 204, 326, 328

Globus Toolkit 110, 111, 116, 341  
gMOD 245  
Google maps, case 264  
graph partitioning 13, 15, 16, 19, 314  
Great Global Grid (GGG) era 4  
GRelC 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 323  
GRelC DAS 98, 100, 101, 102, 103, 104, 105, 106, 107, 323  
GRelC data access service 98–108  
grid accounting, requirements 184  
grid and distributed computing 3  
grid and Internet 3  
grid computing 2, 137, 148, 156, 157, 158, 159, 160, 167, 269–280  
grid computing initiatives in India 292–302  
grid computing, overview 1–11  
grid database 99, 100  
grid database access service 99  
grid job scheduling 23, 28, 30  
grid operating system 156, 158  
grid problem solving environments (PSE) 273  
Grid QoS 75, 76, 77, 78, 79, 80, 81, 82, 83  
grid resource auctions, trust and privacy 85–97  
grid resource information service (GRIS) 274  
grid scheduler 134  
grid security infrastructural (GSI) portal 274  
grid standards organizations 6

**H**

Hadron therapy 245  
HAND 306, 307, 308, 309, 310, 336  
heterogeneity 32, 126, 127, 129, 133  
heterogeneous 57  
high capacity grid platforms 14  
highly available dynamic deployment infrastructure (HAND) 306  
high performance computing (HPC) 12, 14, 21  
high throughput computing 32  
high throughput grid 14  
homogeneous 32, 34  
Hotspots integration 79  
HPC 12, 14, 18, 21  
hybrid system 262

**I**

Ian Foster 110  
Indian grid initiatives 294  
INFN-GRID 226, 232  
international grid projects 7

Internet small computer system interface (iSCSI)  
129  
interoperability 126, 129, 130, 133, 134, 343  
I/O control system (IOCS) 45  
IOCS 43, 45  
iSCSI 129

**J**

Java 281, 284, 285, 287  
JDL 198, 229, 230, 233, 320  
job description language (JDL) 198  
job parameterization 24, 25, 27, 28  
job scheduling 32, 33, 34, 38, 39, 322, 323, 327  
job submission 229  
job submission description language (JSIDL) 26  
job submission interface 23  
JSIDL 26, 29, 313  
jUDDI 150

**K**

knowledge sources (KSs) 220  
Kriging model 256  
KSs 220, 221, 222, 223

**L**

LCG 198, 200, 201, 202, 204, 205, 330  
legacy database 105  
load sharing 31, 32, 33, 34, 36, 37, 38, 39, 322  
LONI 44  
Louisiana Optical Network Initiative (LONI) 44

**M**

market mechanism 172, 175  
market-oriented resource allocation 183, 190  
MDS 149, 155  
message passing interface (MPI) 199  
meta-computing 148  
metadata 262, 264, 265, 266, 268  
metamodel 250, 258  
meta-scheduler 252, 258  
MetaServices 75, 77, 78, 79  
middleware 110, 111, 116, 313, 157, 158, 159, 164, 322, 168, 333, 262, 281, 282, 283, 286, 287, 288  
MMU benchmark 163  
molecular biology 208, 215, 218  
MPI 195, 196, 199, 202, 203, 204, 321, 205, 323, 326  
multidimensional Grid QoS 109, 112, 115

## N

NAREGI 8  
NAS 127, 129  
network attached storage (NAS) 127  
non-centralized control 60, 62  
nuclear physics problem 196

## O

object oriented framework 281, 284, 286  
OGF 190, 193  
OGSA 7, 10, 144, 146  
OGSA-DAI 99, 100, 101, 107, 313, 329  
Open Grid Forum (OGF) 190, 191, 193, 312  
Open Grid Services Architecture (OGSA) 7  
open source 235, 237, 238, 316  
optimal experimental design (OED) 251  
optimization mechanisms 60, 61, 62, 64, 65, 70, 73  
OurGrid 298  
OWL-S 147, 149, 150, 152, 153, 154, 155, 328, 332, 340

## P

parallel computing 147  
parallel image processing, Blackboard architecture 221  
parallel job 39, 322, 323  
parallel processing 60, 62, 69  
partial differential equation 12  
PET 208, 217, 218, 328  
pheromone table 121, 122  
pheromone trail 121  
phylogeny 208, 210, 214, 216, 218  
Planetlab 16  
platform modeling 16  
PMGrid 75, 80, 81  
policymaking 60, 62  
positron emission tomography (PET) 208  
privacy 85, 86, 88, 316, 89, 90, 91, 94, 95, 96, 335  
privacy preserving, implementing 89  
PSE 273

## Q

QoS in grid computing 75–84  
QoS, software system support 70

## R

RAID 127  
Raster3D 245  
RCS 53, 54, 55

RDIG 299  
RDL 26  
real-time 63, 64, 65, 67, 68, 69, 70  
redundant arrays of inexpensive disks (RAID) 127  
relative slowdown 67, 68  
replica consistency 49  
replica consistency service (RCS) 53  
replica consistency, support 53  
replica location service (RLS) 54  
replica management service (RMS) 50  
replica synchronization protocol 52  
resource allocation 33  
resource broker (RB) 171, 179, 228, 312  
resource description language (RDL) 26  
resource discovery 140, 164, 165, 167, 168, 332  
resource management system (RMS) 109, 171  
resource management model 111  
resource usage service (RUS) 190  
RLS 54, 56, 337  
RMS 50, 51, 109, 110, 111, 114, 115  
ROSSE 147, 148, 150, 152, 153  
rough sets 147, 148, 150, 151, 152, 153, 154, 335  
RUS 190, 191, 192, 193, 312, 336  
Russian data intensive grid (RDIG) 299

## S

SAN 127, 129  
scalability 126, 129, 130, 131, 132, 133, 134  
scheduler 197, 200  
SDI 263, 268  
secondary replicas 52  
Semantic Grid 235, 236, 240, 274  
Semantic grid in e-science, framework 235–240  
Semantic Web 149, 154, 155, 332, 335, 340  
service discovery with rough sets 147–155  
service level agreement (SLA) 76  
service oriented storage system grid 126–135  
shared network environment 60, 65  
simulated events 227, 230  
simulation production (SP) 227  
site selection 31, 32, 33, 34, 37, 38  
SLA 75, 76, 79, 80, 81  
SLAC 227, 228, 229, 230  
small computer system interface (SCSI) 129  
SMEs 171  
SP 227, 230  
spatial data, essence 261  
spatial data infrastructure (SDI) 263  
spatial information 260, 261, 267, 316  
Stanford Linear Accelerator Center (SLAC) 227  
static load balancing 14

storage area network (SAN) 127  
storage elements (SE) 51  
storage grid 127, 128, 129, 130, 132  
storage management 128, 133, 321  
Stork 41, 43, 44, 45, 46, 47, 48, 329, 330  
SUMO Toolbox 251, 252, 255, 257  
super-peer architecture 165  
surrogate model 250, 251, 252, 254, 255, 256  
synchronous 52

**T**

TAGPMA 207  
TeraGrid 7  
terrorism 269, 270, 271, 272, 278, 280, 325, 329  
The Americas Grid Policy Management Authority  
(TAGPMA) 207  
t-infrastructure 242, 244, 246, 247  
tomography 208, 211, 218  
tradeoffs 22, 23, 25, 27, 28  
training tool 241, 242  
trust in the grid economy 88  
trustworthy 85, 86, 88, 90, 94, 95, 335

**U**

UDDI 149, 150, 153, 154, 155, 274, 314, 319, 336,  
339, 340  
user interface (UI) 228  
user-scheduler interaction 22, 23, 25, 28

**V**

verifiable auctions 89  
VGVRN 276  
Vickrey auction 172, 173, 174, 177, 178, 179  
virtualization 75, 76, 77, 79, 80, 81, 129, 134  
virtualization hypervisors 160, 161  
virtualization technology 77  
virtualized infrastructure 158, 159, 160, 161, 167  
virtual organization (VO) 111, 128, 165  
virtual workspace 77, 83  
VISHWA 292, 293, 296  
visualisation grid with virtual reality network  
(VGVRN) 276  
VO 111, 157, 159, 160, 165, 166  
volcano sonification 246  
VO-Management module 104

**W**

Walrasian Auctioneer 173, 182  
Web application overview 284  
web interface 281, 282, 284, 287  
Wide in Silico Docking of Malaria (WISDOM) 209  
WISDOM 208, 209, 211, 212, 213, 218  
worker node (WN) 228  
workload balancing 189  
world wide grid, combating global terrorism  
269–280