Index

3G bridge, 49, 66–68

ABAQUS, 427
accelerators, 39
ADAJ, 145
adaptive finite element, 404, 405
adaptive mesh refinement, 253, 256, 404
adaptive methods, 251
adaptive remeshing, 1, 18
adaptivity, 256, 262
Adimallikarjuna, R.V., 395
admissibility constraint, 421
advanced grid portal, 55, 56, 58, 64, 65, 73
ADVENTURE, 450
AEC, 106
Agent Computational Grid, 133
agent-based resource management, 141
agent-based scheduling framework, 150, *see* ASF, 151
agent-based scheduling systems, 148
Agent-Grid Integration Language, 135
Agent-Grid Integration project, 134, 136
Agents in Grid Project, 152
agglomeration procedure, 6, 7
AGIL, *see* Agent-Grid Integration Language
AGIO, 134
AGIR, 100
AGM, *see* algebraic multi-grid method
AGP, *see* advanced grid portal
AiG project, 118, 119, 124, 125
Airbus 350, 11
Aitken acceleration, 217, 219, 224, 233–236, 239, 241, 242
Aitken-Schwarz methodology, 217, 218, 224, 229, 232, 244–247
AIX system, 475
ALE, *see* arbitrary Lagrangian-Eulerian
ALE flux, 5
algebraic multi-grid method, 353
algorithms, 456
Alonso, J.M., 397
Altair PBS, 85
Altivec/VMX , 40
Amazon EC2, 113
AMGA, 99
analysis
  client, 181
  cluster, 183
  server, 181, 185
  tools, 181
ANSYS, 359, 362, 363
ANSYS-ICEM, 356
anti-diagonal algorithm, 280
Apache Tomcat, 87
AppLeS, 143
application integration, 62
application level, 49, 50, 65
  integration, 54, 55, 72
arbitrary Lagrangian-Eulerian, 363
ARC, 52
architecture, 21, 22
  Harvard, 21
  Von Neumann, 22
architectures, 37
ARMS, 148, 149
Arnoldi method, 276
AS, *see* Aitken-Schwarz methodology
assembling matrix, 204

assembly, 429, 430
attached services, 108
auction model, 147
auto-regressive, 392

Bailey, C., 333
balancing domain decomposition, 439, 440, 445, 447–449
bandwidth, 24
bandwidth minimization, 472
bargaining mechanism, 146
Basic Execution service, 54
batch creation, 64
BDC, *see* bidiagonal divide and conquer
BDF2, 256, 257, 271
BEA WebLogic, 85
BeanShell, 149
Beavers, G.S., 225
Beowulf cluster, 300
BFGS convergence, 457
Bhatnagar-Gross-Krook, 375
bidiagonal divide and conquer, 239
binary alloy, 258
biomedicine, 97, 98
BIRN, 84
BIRN portal, 57
blocking, 463
BlueGene, 38
BMPortal, 98–100
BOINC, 49, 53, 59–64, 66–72, 79
Bond, 143, 150
Boucard, P.A., 413
boundary
  interfacial, 338
  moving, 15
boundary conditions, 255, 332
  homogeneous, 230
Bowyer Watson point insertion, 8
BPDL, *see* broker property description language
Brezinski, C., 235
broker, 56
broker property description language, 55
Buyya, K.K.R., 142

C, 33
C++, 459
caching, 22, 24, 25
CancerGrid, 63, 79
cantilever, 330
CAST3M, 456–458, 461, 470, 472, 479
Cauchy's equation, 331
CD-adapo, 360
cell processor, 39, 41, 43
CFD, *see* computational fluid dynamics
CFX, 363
Chakraborty, P., 395
Champaney, L., 413
Chapel, 46
Charkari, N.M., 141
CHEM, *see* chemical process
chemical process, 377, 378
Chen,P.S., 201
Chetverushkin, B.N., 369
CHRONOS, 84
CISC, 24
ClassAd, 120, 121
Classified Advertisement, 120
Clearspeed, 41–43
cloud
  architecture, 112
  computing, 50, 79, 83, 103, 108–109
  platforms, 109
clouds, 83
Clough, R., 199
cluster, 37, 43, 83, 330, 345, 347, 378, 432, 435
CoArray Fortran, 46
coarse
  grid, 263
  model, 418
  problem, 207
Cognard, J.Y., 455
collaboration, 83
combustion, 377
communicating sequential processes
  see CSP, 31
Community Scheduler Framework, 144
compact tension, 475

compressible flows, 1
computational complexity, 254, 275, 290, 291, 293
computational electromagnetics, 309
computational fluid dynamics, 84, 329, 330, 333, 339, 351–353, 356, 365, 378
computational solid mechanics, 333, 335, 339
computational structural dynamics, 329, 330
computing environments, 103
condition number, 201
Condor, 113, 120–123, 144
CONE, 182
conjugate gradient method, 200, 276, 289, 306, 331
  explicit, 289, 290
consistency models, 24
constitutive law, 416, 419
contact, 413, 414
  frictional, 427
  interface, 417, 420
control volume, 3, 332, 355, 356
convection-diffusion, 219
convergence, 228, 233
convergence criterion, 422
convergence rate, 425
Cook, R.D., 335
CORBA, 398
core grid ontology, 130
Cornell, C.A., 111
coupled thermal-solute model, 255
Courant, R., 199
Cray Jaguar, 38
Cray T3E, 232
CrayN, 233
CrayS, 233
Croft, T.N., 329, 331
Cross, M., 329, 333
CSD, *see* computational structural dynamics
CSM, *see* computational solid mechanics
CSP, 31, 33, 34
CT, *see* compact tension
Cuthill-McKee, 472

damping matrix, 332
Dantas, M.A.R., 126
Darcy, 217, 220
Darcy equation, 224, 243, 247
Darcy problem, 241
Darcy's law, 225
Darcy-Stokes problem, 224
Darwin, 143
data aggregation, 397
data coherence, 458, 463
data dependency, 289
data exchange, 362, 423, 457
data integrity, 400
DC-API, 63
DCOM, 398
decomposition
  combined approach, 11
  Delaunay, 10
  domain, *see* domain decomposition
  geometric, 406
  planar, 10
  singular value, *see* singular value decomposition
deforming mesh, 1
DEISA, 86
Delaunay, 8, 9, 11
Demirdžić, I., 333, 334
dendrites, 252
dentritic growth, 252
dentritic structure, 253
derefinement, 262
DES, *see* detached eddy simulation
design, 83
desktop grid, *see* grid desktop
detached eddy simulation, 353
deviatoric stress tensor, 3
DFSI, *see* dynamic fluid structure interaction
DG, *see* grid desktop
DG bridge, 71
Dingle, N.J., 165

direct numerical simulation, 353, 356, 371, 372, 383, 384
Dirichlet, 220, 221
Dirichlet boundary conditions, 240
Dirichlet to Neumann mapping, 220–223
disc coupling, 430
discretisation
  spatial, 3
  time, 4
distributed
  computations, 275
  computing, 84
distributed hierarchical graph neuron, 406–408
distributed shared memory CELL-BE, *see* DSMCBE
DNAmaca, 169, 181
DNS, *see* direct numerical simulation, *see* direct numerical simulation
Dolenc, M., 103
domain decomposition, 2, 10, 11, 199, 200, 202, 213, 329, 371, 404, 405, 413, 414, 440, 457, 461, 468
  mixed, 415
  non-overlapping, 220
  overlapping, 220
  Schwarz, 217–250
domain partitioning, 371
DRMAA API, 183
DRMAA interface, 184
Drools, 149
Drozdowicz, M., 117, 141
DSBCBE, 34
DSMCBE, 30–32
DtoN, *see* Dirichlet to Neumann mapping
dual mesh cells, 3
dual mesh segment, 3
dual substructuring, 415
dynamic fluid structure interaction, 329–350
dynamic load balancing, *see* load balancing dynamic, 369, 372, 376, 383
dynamic partitioning, 382

EA, *see* evolutionary algorithm
edge contributions, 4
EDGeS, 49, 76, 77, 79
  application repository, 70
EDGes, 73
EDGeS 3G bridge, 68
EDGeS application repository, 76
efficiency, 268, 289, 293, 294
EGEE, 49, 51, 66, 68, 71, 79, 85, 98
EGEE bridge, 67
EGEE WMS, 69
eigenvector, 218
Einstein@home, 52
elliptic type, 217
emerging technology, 105
energy, 37
energy functional, 203
EnginFrame, 85–91, 93, 95, 99
ESOPE, 458, 459, 461
EU DEISA, 51
EU EGEE, 51
EU NorduGrid, 51
Euler method, 256–258
European CoreGrid project, 54
evolutionary algorithm, 364
explicit Euler scheme, 257
explicit formulation, 309, 310, 313
explicit time stepping, 4
extrusion, 330

F18C, 17, 18
FA-18C, 16
factorization
  approximate, 278
far field data, 319
Farhat, C., 199–201, 414
Farrar, C.R., 391, 392
FAS multigrid, 5
FAS scheme, 263
FDS, *see* Fire Dynamics Simulator
FDTD, 310, 314, 317–319, 325
FETD, 310, 313, 315–319, 325
FETI, 414
  dual primal, 415
FETI method, 199–202, 211–213

field programmable gate arrays, 23
file download, 90, 91
fill-in effect, 457
fine model, 418
finite difference, 226, 374
finite difference time domain, *see* FDTD
finite element, 199, 333
  analysis, 84, 392, 395, 400, 413, 453
  code, 456–458, 464
  discretization, 277, 421, 443
  mesh, 430
  systems, 275
  time domain, *see* FETD
finite volume, 3, 219, 333, 353
finite volume-unstructured mesh technique, 334
fire dynamics, 95
Fire Dynamics Simulator, 95
fish-bone
  algorithm, 285
  pattern, 277, 279
fluid multiphase, 380
fluid-fluid interaction, 13
fluid-structure interaction, 13, 362
fluid-structure interface, 332
flutter, 4
flux term, 333
folding@home, 52
FORTRAN, 458, 459
FORTRAN 90, 459
Fortress, 46
Foster, I., 107
FP7 EDGeS project, 66
FPGAs, 42
Fragakis, Y., 405
freely programmable gate arrays, 42
friction, 413, 414
friction coefficient, 426
friction indicator, 420
FSI, *see* fluid-structure interaction
Fuller, M.M., 397
FV-UM, *see* finite volume-unstructured mesh technique

Galerkin method, 371
Ganzha, M., 117, 141
Gartner, 104, 106
gas dynamic, 377, 378
gas dynamic flow, 372
gas dynamic process, 383
Gaynor, M., 390, 395
GCL, *see* geometric conservation law
general purpose graphic processor unit, 365, 366
generalised stochastic Petri nets, 165–168, 173, 174, 178, 182, 185
generalized Schwarz alternating method, 219–224, 229, 244
Genius, 99
Gentzsch, W., 83
GenWrapper, 63, 64
geometric conservation, 4, 330
geometric conservation law, 329, 333
GEONgrid, 84
ghost cells, 362
Giannoutakis, K.M., 275
GIBIANE, 457, 461
GIN, 54
GIN Community, 54
GIS, *see* grid information service
gLite, 51, 54, 85, 99
global linear systems, 468
Globus, 54, 85, 122, 123, 127, 128, 151, 275, 303, 399
GLUE, 123, 125, 126, 136
GMRES method, 276
GPGPU, *see* general purpose graphic processor unit
GR2, 52
granularity, 299
graph neuron, 390, 394, 400–403, 406, 407
  algorithm, 394
  distributed hierarchical, 394
graphics cards, 42
Gravvanis, G.A., 275
Green, J.R., 251
grid
  adaptive, 253

architecture, 96
commodity, 395, 398, 399
computational, 93, 95, 107, 141, 142, 145, 389, 395, 397, 404
computing, 49–164, 395
data, 92, 95, 107
desktop, 49, 50, 52, 59–64, 66, 69, 75
environment, 232, 395
generation, 354
generator, 9
global desktop, 52
handler interface, 67
heterogenity, 143
hexahedron, 355, 359
home, 56
information service, 143
infrastructure, 87
integration, 92, 133
interoperability, 54, 126
interoperation, 54
islands, 56
local desktop, 53
middleware, 54, *see* middleware, 398
ontology, 118, 128, 155, 159
portal, 58, 83–102
portal agent, 87
portal security, 91
private desktop, 53
proxy, 395
public desktop, 52
refinement, 355
resource brokers, 146
resource management, 142, 159
resource management systems, 142
scheduler, 143
scheduling, 142
service, 49–51, 75, 107, 128
service providers, 146
task scheduling, 145
technology, 103, 395
tetrahedral, 355, 359
unstructured, 353, 355, 371
user support environment, 63, 75, 79
virtual, 119
grid-sensor network, 395, 401
GridAnt, 58
GridHandler, 67
GridSAM, 54
GridSphere, 84, 85
Gridwisetech, 85
GRIP, 127
GRIP project, 128
GRMS, *see* grid resource management systems
group solvers, 330
GS, *see* grid scheduler, *see* gass dynamic
GSAM, *see* generalized Schwarz alternating method
GSPNs, *see* generalised stochastic Petri nets
GT3, 123
guardcells, 261, 262
Guibert, D., 398
gUSE, *see* grid user support environment

HAGRID, 61
Hartree-Fock, 384
Hassan, O., 1, 309
health monitoring, 392
Hendler, J., 118
heterogeneity, 25
heterogeneous computing, 84
heterogeneous procedure, 338
heterogenous material, 434
hierarchical tree structure, 171
High Performance Computing Profile standards, 54
high-performance computing, 37, 38, 103, 351, 369
high-throughput computing, 103
homogenization, 418
Hooke's operator, 416
Hoschke, N., 390
HTML, 85
hybrid algorithm, 309
hybrid power, 37
HYDRA, 169, 182
hypercube sampling, 432

I/O, 45
IBM AIX, 463
IBM Blue C computer, 323, 325
IBM BlueGene, 44
IBM POWER5+, 475
IBM Roadrunner, 38
IBM WebSphere, 85
ICE4RISK, 112–114
IDA, *see* incremental dynamic analysis
ILU smoother, 353
implicit approach, 253
implicit-explicit formulation, 309, 311, 313, 315, 325
incremental dynamic analysis, 111
incremental method, 464
industrial environment, 456
injection scheme, 5
Instant-Grid, 398–400
InteliGrid, 107
inter-grid mappings, 6
interprocessor communication, 347
inverse
  approximate, 276, 277, 279, 280, 284–286, 289–292, 296, 299, 306
  matrix, 276, 277
island model, 364
iterative method, 217
iterative solver, 419

Jacobi, 217, 234
Jacobi matrix, 241, 243
Jacobi method, 239, 240, 242
JADE, 150
JADE extensions, 149
JadeS, 150
Jameson, A., 5
Japanese Next Generation Supercomputer Project, 38, 43
Jata, K.V., 392
Java, 87
Java CoG Kit, 399
Java RMI, 91
Javascript, 87, 94
JDAM, 16–18
Jimack, P.K., 251, 405
JINI, 398
job
  database, 64, 67
  handler, 67
  manager, 70
  scheduler, 87
  scheduling, 141, 142, 150, 152, 158, 159
  submission description language, 54, 55
jobwrapper, 68, 69
Joseph, D.D., 225
JOSTLE, 338, 348
JSDL, *see* job submission description language
JST flux function, 4

Kacsuk, P., 49
Kepler system, 58
kernel, 206
Kesselman, C., 107
Khan, A.I., 389, 400, 407
kinematic admissibility, 415, 419
kinetic scheme, 369, 372, 373, 375
Klein, M., 354
Knoppix, 399
Knottenbelt, W.J., 165
Knuth, D., 33
Kobayashi, H., 42
Kobe earthquake, 441
Kruis, J., 199
Kuznetsov, Yu.A., 232

LAgent, 152, 153, 156
Lagrange multipliers, 200, 203, 205
Lagrangian Eulerian (ALE), 2
Lanczos, 276
large eddy simulation, 353–356, 361, 365
large scale problems, 456–480
Laszewski, G.V., 399
latency, 24
LATIN, 413, 414, 419, 420, 422–424, 427, 429–432
  multiscale, 414, 423, 435

lattice Boltzmann, 353, 365, 371, 375
LBS, *see* lattice Boltzmann
LDAP attribute, 122
LEACH, 397
Legion, 143
Lei, Y., 392
LES, *see* large eddy simulation
Lewis number, 255–258
LHS, 432–434
Liferay, 84, 85
Linux, 16
Lirkov, I., 117, 141
LMaster, 155–158
LMirror, 158
load balancing, 6, 7, 262, 329, 340, 347, 456, 457
  dynamic, 9, 254
local mesh refinement, 256
logical specification formalisms, 169
look-ahead, 285
  factor, 284
  scheme, 284
low power, 37

macro-segregation, 252
macroforce, 422
macromesh, 418
macroproblem, 423
MAGDA, 151, *see* Mobile agent based grid architecture
Mandel, J., 201
MareNostrum, 371
Martin, S.A., 392
master-slave model, 364
master/worker model, 62
materials, 98
Maxwell's equation, 309, 311, 312
Maxwellian function, 373
McManus, K., 336
mean time
  between failures, 192
  to repair, 192, 193
memory
  bandwidth, 23
  management, 463
  parallelization, 30
  systems, 42
mesh
  adaption, 13, 329
  adaptivity, 261
  deformation, 329
  deformation approach, 2
  generation, 8, 12, 317, 369, 405
  movement, 14
  movement model, 333
  non-regular, 220
  partitioning, 320
  refinement, 256, 404
  regions, 334
  unstructured, 1, 379
meshfree, 217
Message passing interface, *see* MPI
meta-broker, 54–56, 58, 65
metacomputing, 217, 219, 232
metadata, 99
metascheduler, 141, 150
METIS, 6
micro-macro approach, 414, 423
microproblem, 422
Microsoft SharePoint, 85
microstructure, 252, 255
middleware, 49, 50, 52, 54, 56, 65, 85, 92, 98, 99, 117, 120, 121, 127, 130, 141, 143
  integration, 54
MLAT, 271
MLAT scheme, 264
mobile agent based grid architecture, 151
model
  checking tools, 169
  editor, 173
  fluid, 331
  non-Newtonian, 331
  structure, 331
modified conjugate gradient method, 207, 208
MOL, 143
MOMA, 182

Monte Carlo method, 471
Moore's Law, 22
Morgan, K., 1, 309
Moteur, 99, 100
MP, *see* multi-physics
MpCCI, 330
MPI, 9, 44, 46, 72, 73, 182, 232, 275, 277, 301, 413
MPI+OpenMP, 384
MTBF, *see* mean time between failures
Muhamad Amin, A.H., 389
muli-physics, 348
Mullis, A.M., 251
multi-core, 21
multi-grid method, 5–7, 251, 257, 263, 353
multi-physics, 330, 348, 362
multicore nodes, 384
multiparametric strategy, 423, 432, 434
multiresolution strategy, 432
multiscale approach, 423
multiscale computational method, 413
multiscale problems, 251
multiscale strategy, 418
multithreading, 22
MUMPS, 322
MyGrid, 84
MySQL, 67
Möbius, 169

Nadeem, S.A., 405
nanostructure, 385
Nasution, B.B., 407
natural language query builder, 175–179
natural language-based query specification, 175
Navier Stokes equations, 352, 353
Navier-Stokes, 1, 2, 329, 331, 333, 375
NEESGrid, 84
nested dissection ordering, 457
NetSolve, 144
networks, 43
Neumann boundary conditions, 226
Neumann mapping, 220
Neumann-Neumann preconditioning, 440, 447–449
Newmark beta method, 335
Newmark's method, 201, 443
Newton algorithm, 463, 466, 467
Newton methods, 457, 467
Newtonian fluid, 331
next-generation processors, 21
NGS Application Repository, 54
NGS P-GRADE portal, 58
Niagara, 33
NICE EnginFrame, 85
Nimrod/G, 144, 147
Ninf, 143
NIST, 95
NLQB, *see* natural language query builder
node
  child, 170
  grid, 118
  gride, 152
  operation, 170, 175
  standard, 99
  subtree, 184
  value, 170
  worker, 72
non-linear computations, 456–480
non-linear partial differential equations, 251
non-linear problem, 463
non-separable operator, 220
non-uniform discrete Fourier transform, 218
normal contact, 420
Norton Hoff model, 331
nuclear power plant, 439, 441, 444
NUDFT, *see* non-uniform discrete Fourier transform
NUMA architecture, 463
numerical simulation, 369
NVidia Tesla, 28

O'Reilly, T., 105
OGSA, *see* Open grid services Architecture, 128, 397

OGSA standards, 127
oil field, 380
Olejnik, R., 117, 141
OMII-BPEL, 58
OMII-UK, 54
Onate, E., 405
ontology, 117–140
open grid services architecture, 54
OpenMP, 44, 275, 277
OpenPBS, 144
OpenTURNS, 414
Openturns, 432
optimization, 364
overlapping meshes, 309
OWL, 126, 128, 132, 135

P-GRADE, 58
P-Grade, 84
PACE toolkit, 148
PACX-MPI, 232
Pakzad, S.N., 390
Paprzycki, M., 117, 141
parallel approximate inverse matrix algorithms, 275
parallel computing, 199, 217, 251, 439
parallel conjugate gradient method, 275–308
  explicit, 291
parallel processing, 413
parallel strategies, 456
parallelism, 21
  data, 100
  loop-level, 277
  service, 100
parallelization, 309, 330, 336
  memory, 30
  task, 29
PARAMESH, 254, 261–268, 270, 271
parametric analysis, 414
parametric study, 413
Park, S., 392
ParMetis, 320
partial differential equations, 217, 252–255
partitioning, 11, 320, 371
  geometric, 8
  multi-phase, 340, 342, 343
  single-phase, 342
Paszyński, M., 392
pattern recognition, 389, 394, 400, 406
PCPack, 127, 128
PDC3D, 232
PDEs, *see* partial differential equations
PEC, 310, 317, 322, 323, 326
PEGASIS, 397
PERC, 182
perfect electrical conductor, 310
perfect interface, 416
perfectly matched layer, *see* PML
performance
  analysis, 166
  measure, 166
  query, 168, 184
  query editor, 167, 174, 175
  query specification, 167, 168
  requirement, 166
  tree, 165–198
  tree operators, 172
  tree query, 170, 176
performance assessment, 110
Pernas, A.M., 126
PET, *see* positron emission tomography
petri net model, 395
Petri nets, 165, 167
phase change, 252
phase-change problems, 251
phase-field equations, 257
phase-field method, 254
phase-field model, 251, 253, 268
phase-field problem, 263
PHYSICA, 333, 334, 338, 350
PIPE2 Petri net tool, 165, 167, 173–175, 181, 184, 185, 196
place-transition net, 167
Platform LSF, 85
PML, 310, 312, 313, 317
Poggi, A., 149
point insertion, 8

Poisson equation, 232
Poisson problem, 218, 219, 239, 240
porous media, 220, 225, 376
portal agent, 88
positron emission tomography, 95–97
Posix pthread, 456, 457, 460, 480
post processing, 356
PowerPC processor, 40
preconditioned conjugate gradient method , 447
preconditioning, 209, 275–277, 289
primal substructuring approach, 440
prime factorization, 33
PRISM, 169
PROBI, 182
processor farm, 378
productivity, 193, 194
profitability, 193
programming, 37
projection matrix, 209
pseudo-inverse matrix, 205
public desktop grid, *see* grid public desktop
Python, 33, 432

QGDE, *see* quasi-gasdynamic system
QNs, 170
QoS, *see* quality of service
quality of service, 118, 129, 166, 188, 189
quantum transistor, 385
quasi-gasdynamic system, 372–377
query specification, 170
queue manager, 64, 67
queueing network, 170

radar cross section
see RCS, 319
radiation treatment, 31
RANS method, *see* Reynolds Averaged Navier Stokes
Rayleigh damping, 332
RCS, 319, 323, 325
refinement, 262
remeshing, 15
remote file browsing, 93
Resch, M.M., 37
resolution algorithm, 424
resource aggregators, 119
resource brokering and management, 117
resource management, 141
Reynolds Averaged Navier Stokes, 353
Reynolds number, 353, 354
RFB, *see* remote file browsing
RISC, 24
RMI, 89
Robin boundary conditions, 220
Rosam, J., 251
Rossi, T., 232
Roux, F.-X., 199, 200, 414

SaaS, *see* Software as a Service
Saffman, P.G., 225
scalability, 45, 78, 84, 201, 233, 266, 267, 271, 330, 336, 347, 348, 423
scale separation, 417
scattering, 309–311, 374
Schäfer, M., 351
scheduling systems, 148
Schroedinger, 384
Schur complement, 446, 447, 449
Schwarz domain decomposition, 217, 244
Schwarz method, 200, 224, 226–229, 232–234, 244, 247
Schwarz Neumann-Dirichlet algorithm, 222
Secure Sockets Layer, 92
seismic simulation, 439–442
semantic information processing, 117
semi–discrete equation, 4
Senobari, M., 117, 141
server, 88, 89, 91
  parallelism, 378
  portal, 87
service
  availability, 191
  level agreement, 118, 165, 167, 188
  level agreement metrics, 189
  level agreement monitoring, 193
  level agreement specification, 191

level productivity, 191
service grid, *see* grid service
service level agreement, 129, 146
SETI@home, 52
SG, *see* grid service
SGI Altix3700B2, 440
Shank formula, 235
shape functions, 332
shared memory, 457, 459, 461, 470
shared memory model, 384
shared virtual memory, 458, 460
shared-distributed memory computers, 458
SHARPE, 169
SIMD, 28
SIMPLE pressure correction, 331
simulation, 83
single program multiple data, 9
singular value decomposition, 217, 220, 236–242, 244, 246, 247
SLA, *see* service level agreement
Slone, A.K., 329, 333, 334
SMARTA, 169, 182
SMECN, 397
smoothing
elliptical, 356, 361
SMP, *see* symmetric multiprocessor
SOADAJ, 145
SOAP, 99
Sobolev space, 220
software agents, 117, 142
Software as a Service, 103, 108–110
Sohn, H., 391, 392
soil-structure interaction, 441
solid-liqued interface, 252
solidification, 251
solver
group based, 338
solver parallelisation, 2, 6
Spalart Allmaras, 3
sparse linear systems, 275–308
SPAs, 170
spatial adaptivity, 257
speed
interconnect, 45
memory, 45
speed-up, 7–9, 289, 293, 294, 296–305, 322, 347, 423, 425, 452, 457, 465, 480
super linear, 2
SPIN, 397
SPM, *see* statistical parametric mapping
SPMD, 9, 42
SPNP, 169
SPNs, 170
spooler, 87, 89, 93
virtual, 94
SRB, *see* storage resource broker
SSL, *see* Secure Sockets Layer
staggered soluition, 335
StarCD, 360
static admissibility, 416, 419
statistical parametric mapping, 95, 96
Steklov-Poincaré operator, 219, 221, 222
Sternel, D.C., 351
STI CELL-BE, 26–28
stiff systems of equations, 251
stochastic
modelling, 165
models, 166
Petri nets, 165, 167
Stokes, 217
Stokes equation, 224
storage resource broker, 83, 92–96
structural
analysis, 391, 397, 441, 458
design, 391, 395
engineering, 389
health monitoring, 389–395, 403, 408
substructure, 416, 430, 431
substructuring, 200
subtree, 184
Sun ES Portal Server, 85
Sun Grid Engine, 85
SUN Niagara, 26, 27
Suto, T., 165
SVD, *see* singular value decomposition
symmetric multiprocessor, 275, 281, 294,

296
synergistic processor elements, 40
system
availability, 191
system architecture, 43
system monitoring, 158
SZTAKI, 59
SZTAKI desktop grid system, 59, 60

T2 processor, 26
T3 processor, 26
Tai, C.H., 397
task distribution, 462
task scheduling, 145
task-parallelization, 29
Taverna, 58
Taylor, G.A., 333
TEA, *see* topological ϵ algorithm
Telegin, P., 117, 141
temporal discretisation, 335
tender/cotract-net mechanism, 146
Tezaur, R., 201
thermal diffusivity, 255
thermo-fluid physics, 338
tier
client, 86, 87
resource, 87
server, 87
service, 87
time accuracy, 1
time domain, 309
time series analysis, 392
time-stepping scheme, 256
Toivanen, J., 232
tool
languages, 169
support, 165
TOP500, 38, 45, 47
topological ϵ algorithm, 220, 235
traction-torsion, 474
transaction system, 186
transient flows, 2
transmission conditions, 228
transmisson conditions, 418
tree
operators, 172
performance, 185
query, 170
specification, 177
Triana, 58
Tromeur-Dervout, D., 217, 398
Tsubame system, 43
Tuecke, S., 107
turbulence, 351, 353, 354, 372
Turner, M., 199

UG toolbox, 254
UK NGS, 51
UNICORE, 121, 122, 126–128
UniCore, 51, 54
UniGrid, 128, 136
UniGrid project, 128
unilateral contact, 416, 417
unsteady flow, 14
unstructured mesh, *see* mesh unstructured
UPC, 46
uPortal, 84, 85
Urquiza, J.M., 226
US OSG, 51
US TeraGrid, 51

value nodes, 178
Vassilevski, P.S., 232
Verpeaux, P., 455
vgDL, *see* virtual grid description language
VGrADS, *see* Virtual Grid Application Development Software
Vidal, A., 126
Vinter, B., 21
virtual experiments, 83
Virtual Grid Application Development Software, 119
virtual grid description language, 119, 120
virtual memory, 459, 480
virtual organisation, 51, 68–70, 72, 73, 75, 79, 98, 128, 134
visualization, 372

VO, *see* virtual organisation
volume generation, 11
volume remeshing, 15
Von Neumann
    architecture, 21, 22
    barrier, 21
    bottleneck, 22, 23

Wang, M., 390
water saturation, 382
WDSL, 99
weak form, 332
web
    portal, 85
Web 2.0, 103–116
Web 4.0, 117, 118
web sevices, 397
WebCom-G cluster, 303
Williams, A.J., 329, 338, 344, 345
wireless sensor network, 389, 390, 393–396, 400–405, 407, 408
worker, 156, 158
workers, 155–157
workflow
    management, 99
World Wide Grid, 49, 50, 55–58, 65, 73–75, 78, 79
World Wide Web, 49, 56, 57
wrapper script, 70
WS-PGRADE/gUSE, 73
WSN architecture, 390
WWG, *see* World Wide Grid
WWW, *see* World Wide Web

X-10, 46
XHTML, 87
Xie, Z.Q., 309
XML, 85
XSL, 85
XtremWeb technology, 53

Yamada, T., 439

mmix