

# Haskell: Batteries Included

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 Well-Typed

| galois |

Data visualisation by  tupil

# Libraries, Libraries, Libraries

- Languages succeed on the strength of libraries
- Great languages let us make more and better libraries
  - Quality: safer, flexible, composable libraries
  - Quantity: productivity, more reuse, sooner
- Haskell, the language, is done! (Well...)
- Now, libraries ... and **world domination!**

# 1990-2003: The dark ages

- Every Haskell app had its own build system
  - Endless twisty Makefiles
  - Nothing worked on Windows
- 3 Haskell libraries in the world
- Everything in base
- Applications bundled their own dependencies
- “Cathedral” model

# 2004-2008: The enlightenment

- Cabal: declarative package specifications
  - Includes a build system for simple packages
  - Many packages now build on Windows
- Hundreds of packages published on Hackage
  - <http://hackage.haskell.org>
  - *“If it's not on Hackage, it doesn't exist”*
- cabal-install: automated dependency chasing
- We begin to move from “Cathedral” to “Bazaar”

# Submit to ICFP **AND** Submit to Hackage

- On Hackage
  - QuickCheck
  - SmallCheck
  - Yi
  - CLASE
  - S&E session types
- Lost to the world
  - Lightweight monadic regions
  - Lightweight information flow security
  - P&T session types
  - Utrecht “gread” parsers

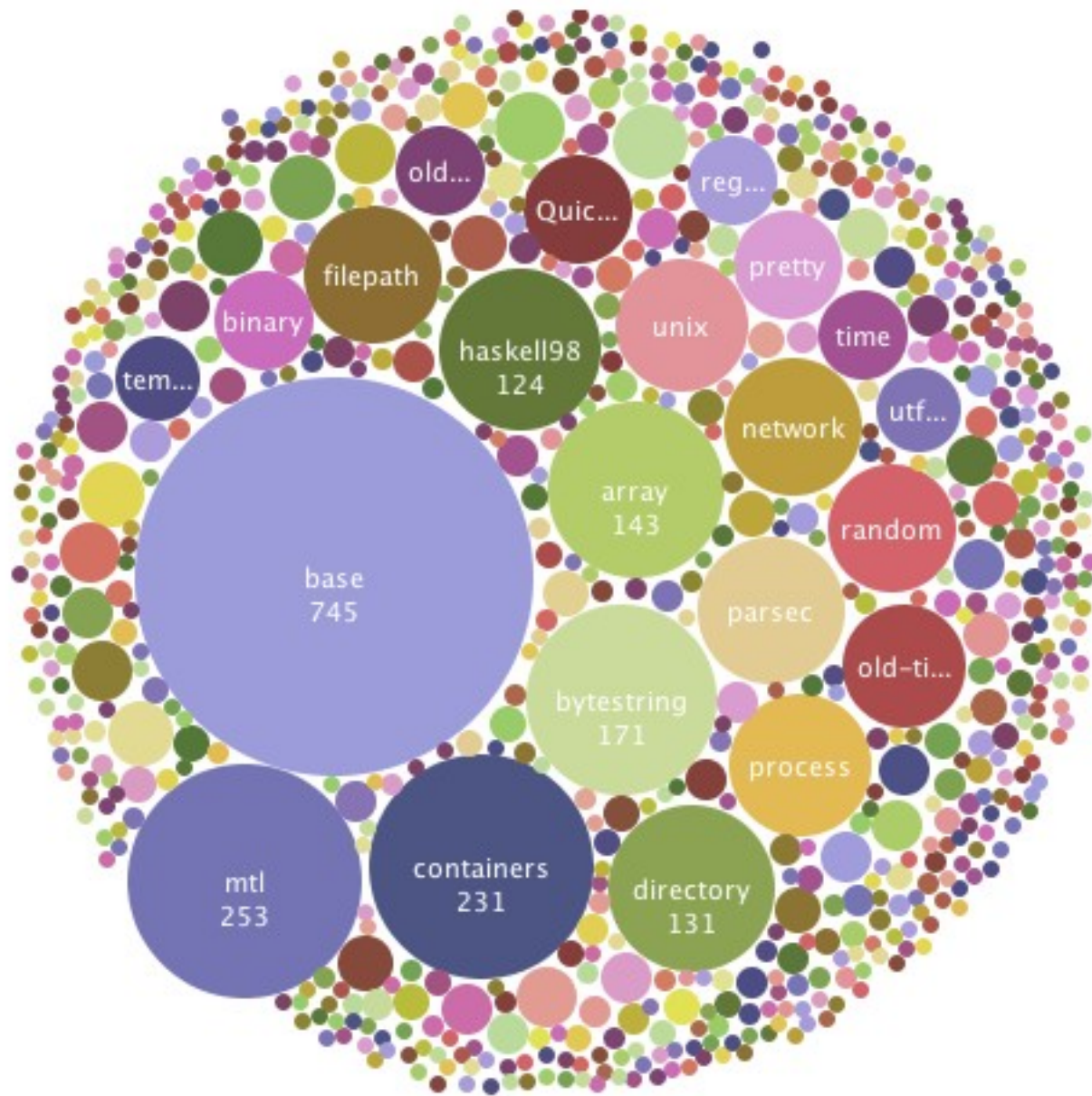
# Community: our greatest asset

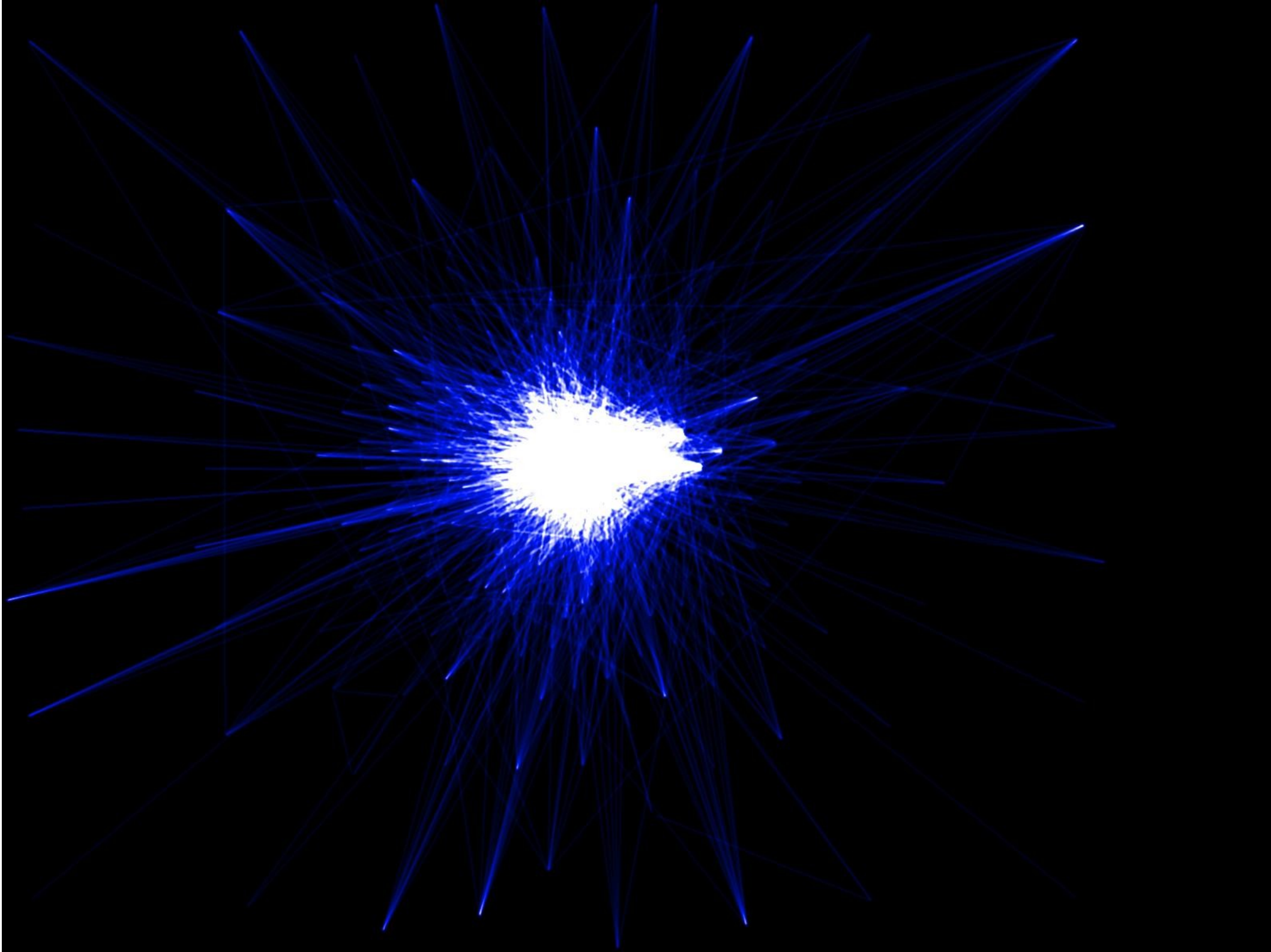
- We don't have the corporate backing of Java
- But we do have a large, passionate, active community
- Hundreds of developers across the world writing libraries for the community
- Focus this effort into a world-beating technology – in parallel
- We must use an open source “bazaar” organisation model to drive Haskell forward

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AlistairBayley AllanClark AndrePang AndreaRossato AndreaVezzosi AndresLoeh AndrewPimlott AndrewRobbins  
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HansVanThiel HenningGuenther HenningThielemann HiteshJasani HoldenKarau HristoAsenov IanLynagh IavorDiatch  
IgorBohm IsaacJones IvanTomas JaapWeel JanChristiansen JanisVoigtlaender JasonDagit JasonDusek JasonOrendorff  
JeanPhilippeBernardy JedBrown JeffersonHeard JensPetersen JeremyApthorp JeremyShaw JimSnow JinjingWang  
JochemBerndsen JoelReymont JohanTibell JohannesAhlmann JohannesWaldmann JohnGoerzen JohnLato JohnMacFar  
JohnMcCall JohnMeacham JohnVanEnk JonFairbairn JosefSvenningsson JostBerthold JudahJacobson JuergenNicklischF  
JustinBailey KetilMalde KevinEllis KidoTakahiro KrasimirAngelov KyleConsalus LajosNagy LennartAugustsson  
LennartKolmodin LeonidasFegaras LuisAraujo LukasMai LukePalmer LutzDonnerhacke MadsLindstroem MagnusJonss  
MagnusTherning MalcolmWallace ManuelChakravarty MarcWeber MarcoSilva MarioBlazevic MarkWassell MarkoLaur  
MarshallBeddoe MartijnVanSteenbergen MartinGrabmueller MartinLuetke MartinSulzmann MasatakeDaimon  
MattMorrow MatthewDanish MatthewMorrow MatthewNaylor MatthewSackman MattiNiemenmaa MaxBolingbroke  
MaxRabkin MichalKonecny MiguelVilaca MilanStraka MiloslavRaus NatarajanRajagopal NeilBrown NeilMitchell  
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PawelMurias Pepelborra PeterGammie PeterGavin PeterJonsson PeterSimons PeterTanski PiyushKurur RalfHinze  
ReinierLamers RickKaudewitz RobertDockins RobinGreen RohanDrape RomanLeshchinskiy RossPaterson  
RussellOConnor RyanIngram SamuelBronson ScottDillard SeanLeather ShaeErisson SigbjornFinne SimonMarlow  
SimonPeytonJones SpencerJanssen StefanKersten StefanORear StephanFriedrichs StephenBlackheath StephenCook  
StephenLihn SterlingClover StuartCook SveinOveAas SvenMoritzHallberg SvenPanne TaruKarttunen ThomasDavie  
ThomasDuBuisson ThomasHartman ThomasVanNoort ThorkilNaur TimChevalier TimDocker TimNewsham  
TomBevan TomMoertel TrevorElliott TristanAllwood TwanVanLaarhoven UweSchmidt VasiliGalchin VincentKraeutler  
VivianMcPhail WaltBaety WillThompson WolfgangJeltsch WolfgangThaller WouterSwierstra WrenThornton YangZha  
YannGolanski YoshikuniJujo alpheccar

Adaptive adhoc-network AERN-Real AERN-RnToM AGI alex also-midi ALUT ansi-terminal ansi-wl-pprint anydbm AppleScript applicative-extras array Array arrows ASN1 astar attoparsec AutoForms autoproc AvlTree backdropper Barracuda base base64-string baskell benchpress bencode BerkeleyDB Ber binary binary-search binary-strict bio bitset BitSyntax bktrees blas blockio bloomfilter bot botpp brainfuck bytestring bytestring-csv bytestring-lexing bytestring-mmap bytestringparser bytestringreadp bytestring-show bzlib c2hs Cabal cabal2arch cabal-install cabalmdvrpm cabal-rpm cabalrpmdeps cabal-test cabal-upload calc carray category-extras CC-delcont cedit cgi cgi-undecidable chalmers-lava2000 change-monger Chart ChasingBottoms chunks citeproc-hs CLASE classify clevercss clustertools cmath Codec-Compression-LZF Codec-Image-DevIL codec-libevent collections colock comp ConfigFile conjure containers ContArrow control-event control-monad-free control-monad-omega control-timeout COrdering CouchDB CPBrainfuck crack Crypto csv ctemplate curl darcs-buildpackage darcs-cabalized darcs-graph darcs-monitor data-accessor data-accessor-template data-default datapacker DBus debian debian-binary Decimal DeepArrow denominate dephd derangement derive dfsbuild diagrams Diff dimensional directory Dist dlist dnsrbl dotgen download download-curl DrIFT dsp EdisonAPI EdisonCore edit-distance editline emgm Emping Encode encoding equinox estreps event-list exif fastcgi fckeditor fec feed feed-cli fenfire FermatsLastMargin fft fgl FileManip filepath Finance-Quote-Yahoo Finance-Treasury FindBin finger FiniteMap firstify fitsio fixpoint Flippi flock flow2dot folkung foo formlets fps frag free-theorems fst FTGL ftphs ftshell funcmp functorm FunGen funsat gameclock garsia-wachs gd genericserialize generic-xml GenI geniconvert Geolp ghc-core ghc-paths GLFW glome-hs GLUT goa GoogleChart gopher graphics-drawingcombinators graphmod GraphSCC graphviz gravatar greencard greencard-lib GroteTrap GrowlNotify gsl-random GuiHaskell GuiTV hackage-sparks hackport haddock HaLeX halves happraise HAppS HAppS-Data happs-hsp happs-hsp-template HAppS-IxSet HAppS-Server HAppS-Stat HAppS-Util happy harchive harp harpy Hashell hasim haskeline haskell98 haskelldb haskelldb-dynamic haskelldb-flat haskelldb-hdbc haskelldb-hdbc-haskell haskelldb-hdbc-postgresql haskelldb-hdbc-sqlite3 haskelldb-hsql haskelldb-hsql-mysql haskelldb-hsql-odbc haskelldb-hsql-postgresql haskelldb-hsql-sqlite3 haskell-in-space haskell-src haskell-src-exts hask-home HaXml haxr haxr-th hback hbeat hburg HCL HCodecs hCsound HDBC HDBC-postgresql HDBC-sqlite3 heap Hedi helisp hetris hexdump hexpat hfann hfov HFuse hgal hgalib hg-buildpackage hgdbmi hgeometric HGL hicc highWaterMark himerge hinotify hinstaller hint hinvaders Hipmunk HipmunkPlayground HJavaScript hjs HJScript HList hmarkup hmatrix hmm hmp3 Hmp homeomorphic hoogle hopenssl hosc hpaste hpc HPDF hpodder HRay hS3 HsASA hsc2hs hsc3 hsclock hscolor hscurses hsdip hsdns hsemail hshsgnutls-0.2.3-barracuda HSH HsHaruPDF HsHyperEstrailer HsJudy hslackbuilder hslogger hslogger4j hslua hsmagick hsndfile hsns hsntp HsOpenSSL hsparklines HsParrot hsp-cgi HsPerl5 hs-pgms hspread hspr-sh hsql hsql-mysql hsql-odbc hsql-postgresql hsql-sqlite3 hsSqlite3 HsSVN HsSyck hstemplate HStringTemplate hsx hsXenCtrl hsx-xhtml hsyslog htar HTF html HTTP HTTP-Simple HUnit HXQ hxt hxt-filter hxweb hybrid i18n iconv ieee ieee-utils iEXIFS Imlib INblobs IndentParser infinity infix interleavableGen interleavableIO interlude IOR IOSpec ipc ipprint irc ircbouncer ivor jack json kbq-gu kibro lambdabot lambdabot-utils lambdaFeed LambdaHack LambdaShell language-c lax lazyarray lazysmallcheck lcs LDAP leksah lhs2tex libGenI libmpd libxml lighttpd-conf-qq line2pdf linkchk lispparser list-extras ListLike llvm loch log logfloat logict lojban LRU Lucu mage magic markov-chain matrix-market maybe MaybeT mdo memcached MemoTrie mersenne-random mersenne-random-pure64 MetaObject metaplug microbench midi mime mime-string mines mkbndl mkcabal mmap mohws monadenv Monadius monadLib monad-param MonadPrompt MonadRandom monte-carlo mpdmate mps mtl mtlparse nano-hmac nano-md5 nat network network-bytestring network-connection network-dns network-minihhttp network-multicast network-rpca NewBinary non-negative numbers numeric-prelude numeric-quest nymphaea obdd ObjectIO oeis old-locale old-time omnicodec only OpenAFP OpenAFP-Utils Open open-witness opml packedstring PageIO panda pandoc paradox parallel parameterized-data parport PArrows parseargs parsec parsedate parse-dimensions pcre-light pdf2line penn-treebank permutation pesca phooey photoname Pipe pkcs1 pkg-list.html plugins pngload pointfree polyparse popenhs port posix-realtime PostgreSQL postmaster powermate pqc pretty printf-mauke Printf-TH probability ProbabilityMonads process prof2dot proplang protocols PSQueue Pugs pugs-compatible pugs-DrIFT pugs-hsregex pugs-HsSyck pureMD5 pxsl-tools quantum-arrow QuickCheck quickcheck-script random Random RandomDotOrg Ranged-sets rbr rdtsc reactive readline recent.html recent.rss regex-base regex-compatible regex-dfa regex-parsec regex-pcre regex-posix regexpr regexqq regex-tdfa regex-tdfa-0.92-ghc regex-tre reify ReviewBoard riot RJson rmonad roquestar-engine roquestar-gl rosezipper rss2irc safe Safe safecopy sat sat-micro-hs scaleimage scc scenegraph scgi SDL SDL-gfx SDL-image SDL-mixer SDL-mpeg SDL-ttf selenium sessions Shellac-compatible Shellac-editline Shellac-readline shell-pipe show Shu-thing simpleargs simseq smallcheck soegtk sonic-visualiser SpaceInvaders special-functors sphinx sphinx-cli sqlite srcinst state stb-image stemmer stm STMonadTrans storable-complex storablevector StrategyLib Stream streamproc strict strict-concurrency strictify stringsearch stringtable-atom suffixtree swf SybWidget syb-with-class system-inotify tabular tagsoup Take template template-haskell terminfo test-framework testpattern thih th-lift thrist tic-tac-toe time TimePiece topkata torrent traced tracker trhsx truelevel twidge twitter typalyze TypeCompose Typelluminator type-int type-level typeof uconv ucode uhexdump unicode-names unicode-normalization unic uniplate unix unix-compatible unix-pty-light Unixutils unlambdai url urlcheck utf8-light utf8-string uuagc uuid uulib uvector validate value-supply Vec vector vector-space vty wavconvert WAVE WebBits whim Win32 Win32-notify winerror Wired witness wl-pprint WordNet WURFL wx wxcore wxFruit WxGeneric







<input type="checkbox"/>	unsupported lib	<b>haskell-adaptive 0.22-1</b>	0		Library for incremental computing.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-adhoc-network 1.0.3-1</b>	0		Ad-hoc P2P network protocol	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-aern-real 0.9.6.1-1</b>	2	Yes	arbitrary precision interval arithmetic for approximating exact real numbers	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-aern-rntorm 0.4-1</b>	1	Yes	polynomial function enclosures (PFEs) approximating exact real functions	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-agi 1.2.2-1</b>	1	Yes	A library for writing AGI scripts for Asterisk	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-alsa-midi 0.3.2-1</b>	0		Bindings for the ALSA sequencer API (MIDI stuff)	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-alut 2.1.0.0-1</b>	1		A binding for the OpenAL Utility Toolkit	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-ansi-terminal 0.5.0-1</b>	0		Simple ANSI terminal support, with Windows compatibility	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-ansi-wl-pprint 0.4.0-1</b>	0		The Wadler/Leijen Pretty Printer for colored ANSI terminal output	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-anydbm 1.0.5-1</b>	0		Interface for DBM-like database systems	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-applicative-extras 0.1.3-1</b>	2	Yes	Instances for Applicative	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-arrayref 0.1.2-1</b>	0		Unboxed references, dynamic arrays and more	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-asn1 0.0.1.1-1</b>	0		ASN.1 support for Haskell	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-astar 0.2.1-1</b>	1	Yes	General A* search algorithm.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-attoparsec 0.4-1</b>	1		Combinator parsing with Data.ByteString.Lazy	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-avltree 4.2-1</b>	0		Balanced binary trees using the AVL algorithm.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-barracuda 1.0.2-1</b>	0		An ad-hoc P2P chat program	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-base64-string 0.1-1</b>	0		Base64 implementation for String's.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-benchpress 0.2.2.2-1</b>	2	Yes	Micro-benchmarking with detailed statistics.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bencode 0.3-1</b>	0		Parser and printer for bencoded data.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bimap 0.2.4-1</b>	3	Yes	Bidirectional mapping between two key types	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-binary 0.4.3.1-1</b>	9	Yes	Binary serialisation for Haskell values using lazy ByteStrings	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-binary-search 0.0-1</b>	1		Binary and exponential searches	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-binary-strict 0.3.1-1</b>	1		Binary deserialisation using strict ByteStrings	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bio 0.3.3.4-1</b>	0		A bioinformatics library	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bitset 0.6-2</b>	0		A functional data structure for efficient membership testing.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bitsyntax 0.3.2-1</b>	1		A module to aid in the (de)serialisation of binary data	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bktrees 0.2.1-1</b>	0		A set data structure with approximate searching	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-blas 0.5-3</b>	1		Bindings to the BLAS library	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bloomfilter 1.2.5-1</b>	2	Yes	Pure and impure Bloom Filter implementations.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bytestring 0.9.1.2-1</b>	2	Yes	Fast, packed, strict and lazy byte arrays with a list interface	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bytestring-csv 0.1.2-1</b>	1	Yes	Parse CSV formatted data efficiently	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bytestring-lexing 0.1.2-1</b>	0		Parse literals efficiently from bytestrings	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bytestring-mmap 0.2.0-1</b>	2		mmap support for strict ByteStrings	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bytestring-show 0.2-1</b>	0		Efficient conversion of values into readable byte strings.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bytestringparser 0.3-1</b>	0		Combinator parsing with Data.ByteString.Lazy	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bytestringreadp 0.2-1</b>	0		A ReadP style parser library for ByteString	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-bzlib 0.4.0.3-1</b>	4		Compression and decompression in the bzip2 format	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-cabal 1.4.0.2-1</b>	35	Yes	A framework for packaging Haskell software	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-carray 0.1.2-1</b>	1		A C-compatible array library.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-category-extras 0.53.5-1</b>	1		Various modules and constructs inspired by category theory	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-cc-delcont 0.2-1</b>	1		Delimited continuations and dynamically scoped variables	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-cedict 0.2.5-1</b>	0		Convenient Chinese phrase & character lookup.	arch-haskell
<input type="checkbox"/>	unsupported lib	<b>haskell-cgi 3001.1.7.0-1</b>	3	Yes	A library for writing CGI programs	arch-haskell

# Now: The Haskell Platform

- **Selection of packages from Hackage**
- Consistent set of package versions
  - Tested together on all popular platforms
- Regular releases, every 6 months
  - You can download it
- Easy to install on all popular platforms
  - Binary installers
  - Supported by the distros
- Community process for new packages

# This structure works

Haskell Platform

GNU/Linux distro

GHC

Linux kernel

Hackage

SourceForge

Cabal

.rpm / .deb

cabal-install

yum / apt-get

Simon & Simon

Linus & Alan Cox

# What's in the platform for me?

- New Haskell users and systems administrators
  - “How do I get Haskell?”
- Application authors
  - One true Haskell release to build upon
- Library authors
  - Standard set of versioned dependencies
  - Wide distribution and publication for their work
- Compiler authors
  - Get back to writing compilers



# Future

- More and better infrastructure
  - Build reporting
  - Testing and code coverage
  - Useful quality information for package users
  - Available to all packages in Hackage
- More and better libraries
- Larger and better Haskell Platform
- World domination

