

G-WAN®

Application Server

(Global-WAN.com's infrastructure)

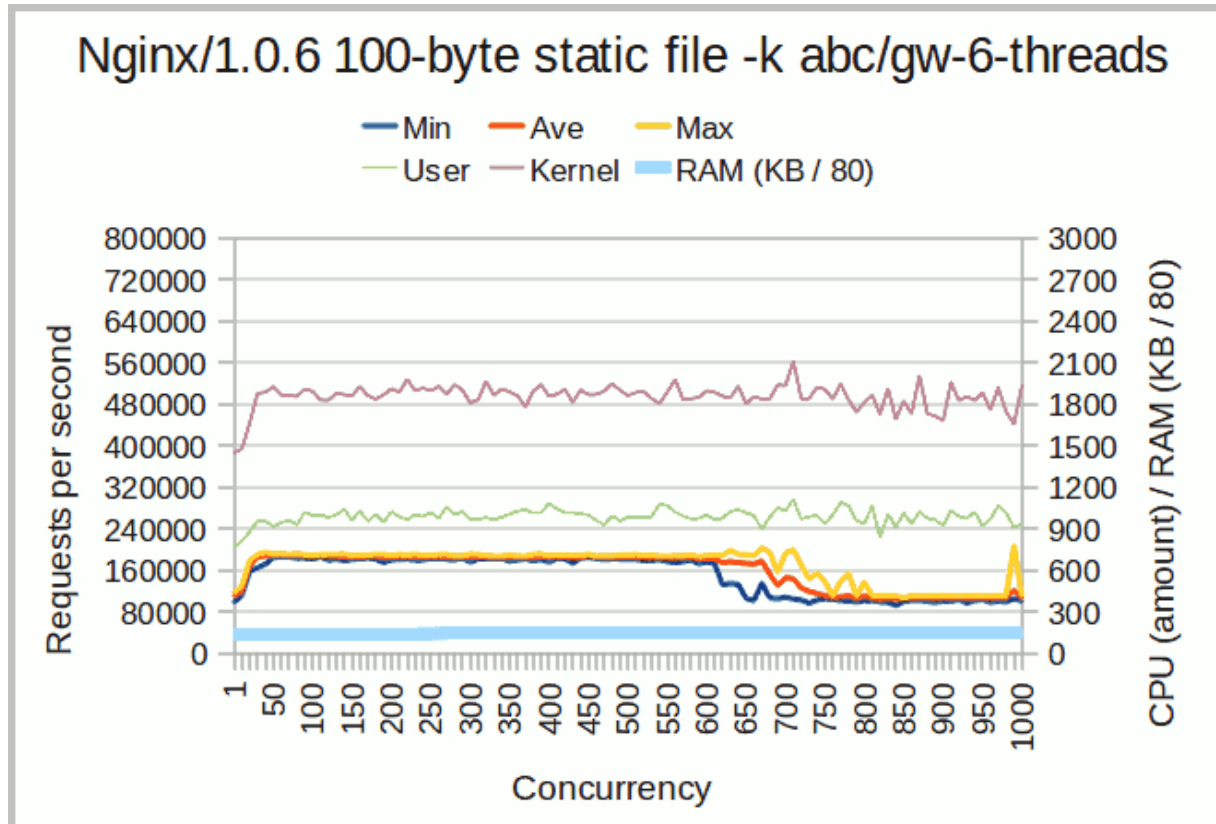
Built For Clients And Servers

gwan.com

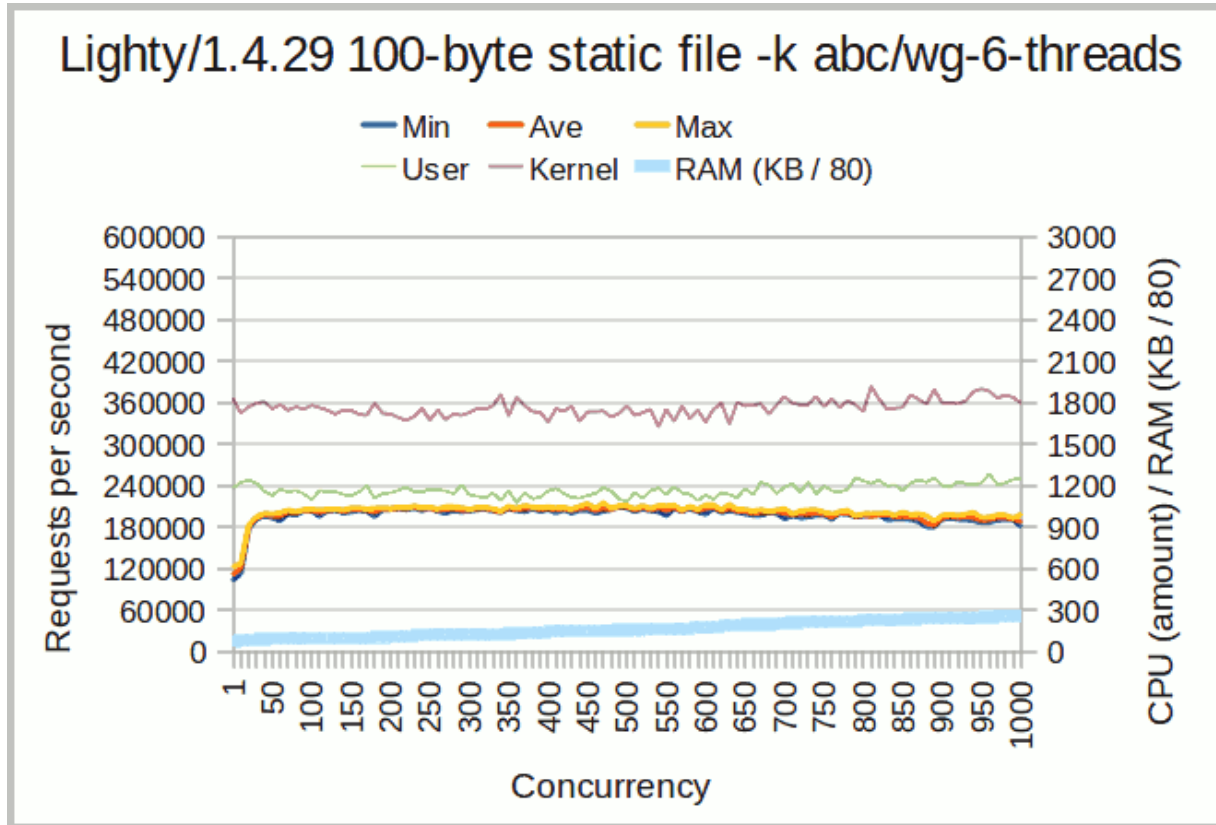
This document is aimed at helping people to understand the G-WAN technology. The data and charts included here follow documented procedures that require system tuning, and proper multi-thread client tools. This information is available on the G-WAN website. All these tests have been made on an 6-Core Mac Pro (Intel Xeon CPU W3680 @ 3.33GHz) with earlier versions of G-WAN. The latest release is faster due to constant improvements. This document is only a quick overview of why using G-WAN brings benefits on multicore systems. Further information regarding the internals of TWD Industries AG's technology are available under a proper NDA, to selected partners.

**Faster, More Scalable,
Using Less CPU / RAM Resources
Than All
Web Server,
App. Servers, and
“Web Accelerators”**

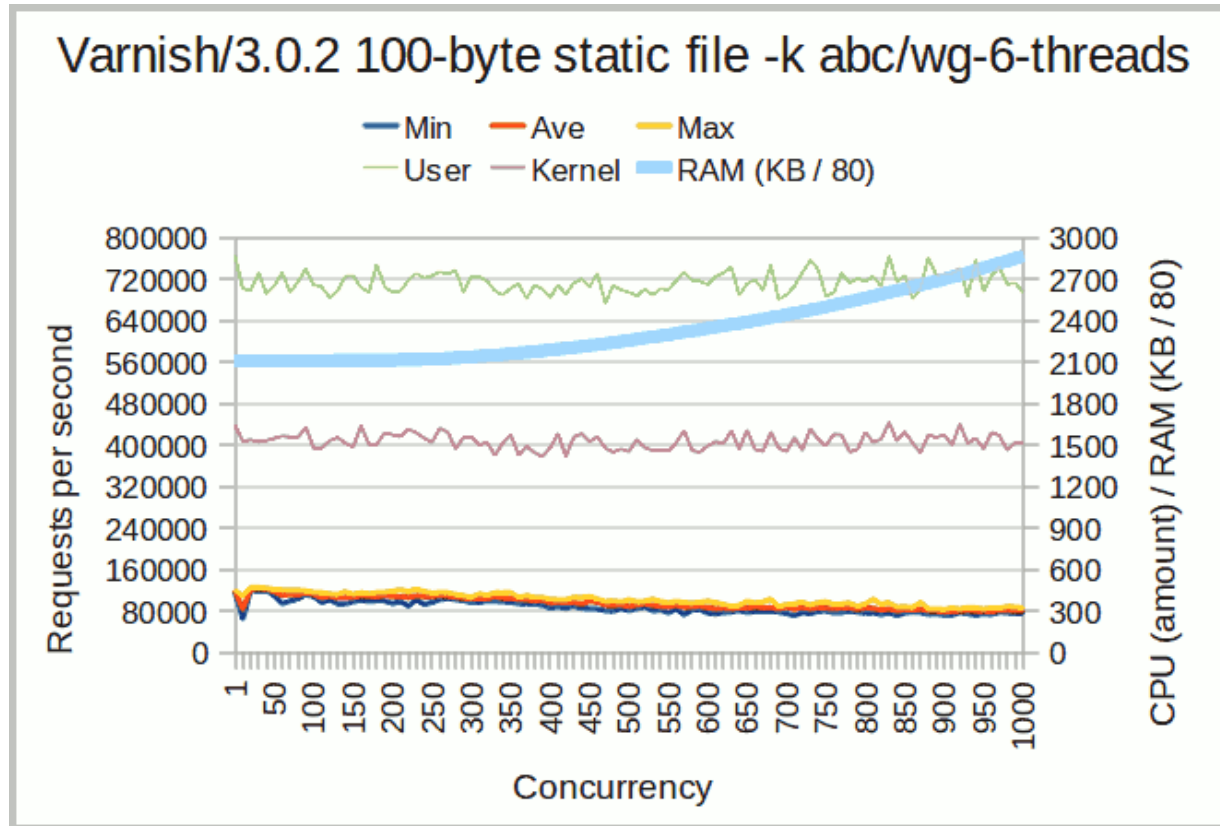
Nginx – Web Server



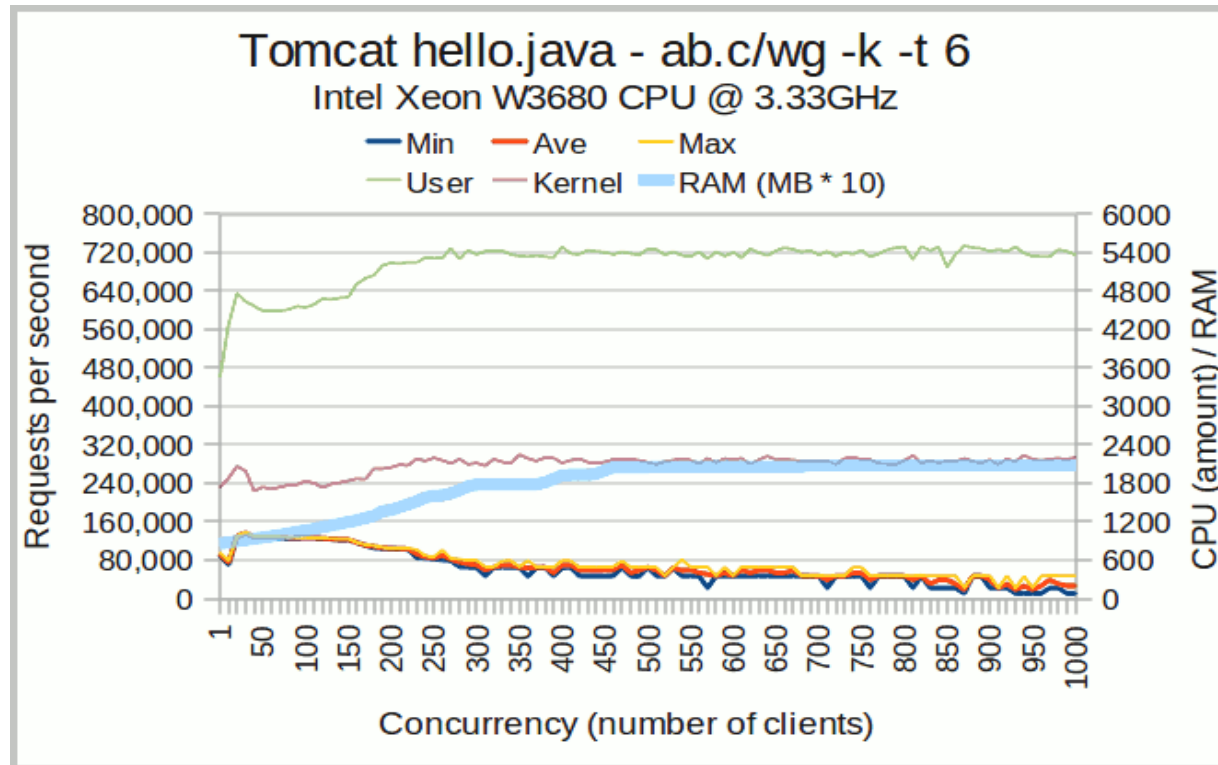
Lighttpd – Web Server



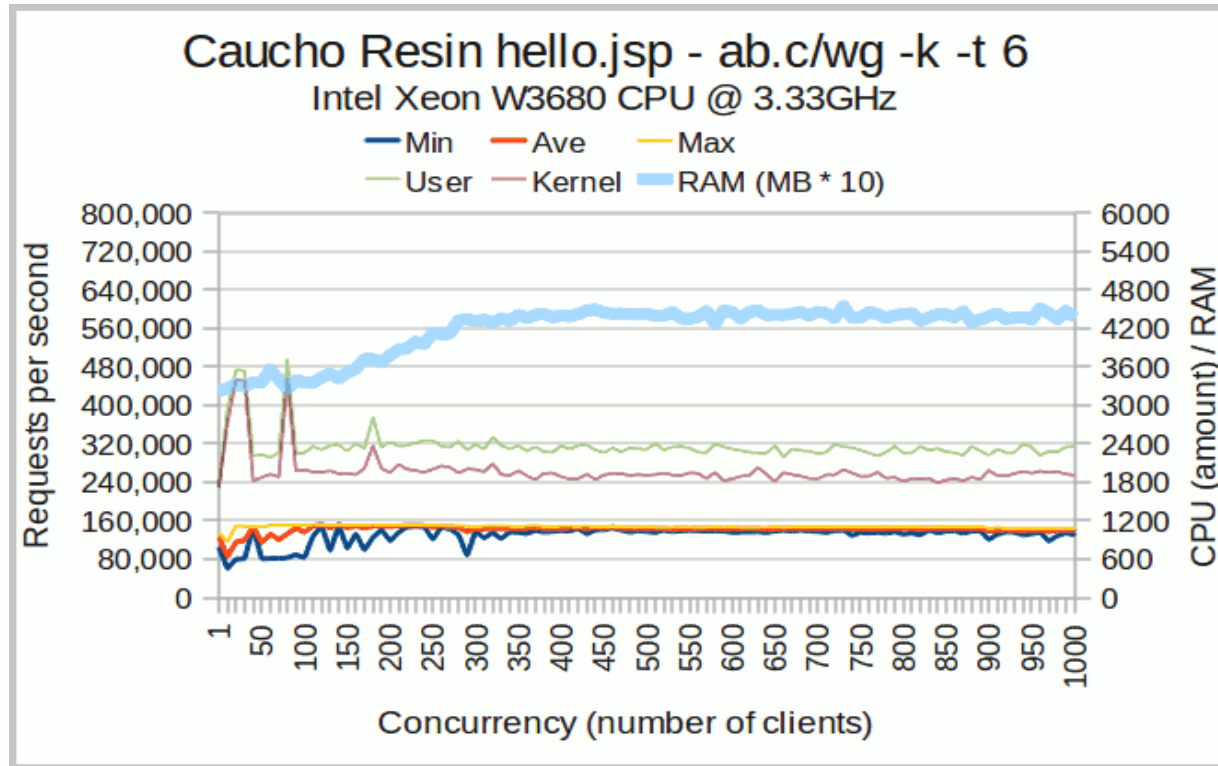
Varnish – Web “Accelerator” (cache)



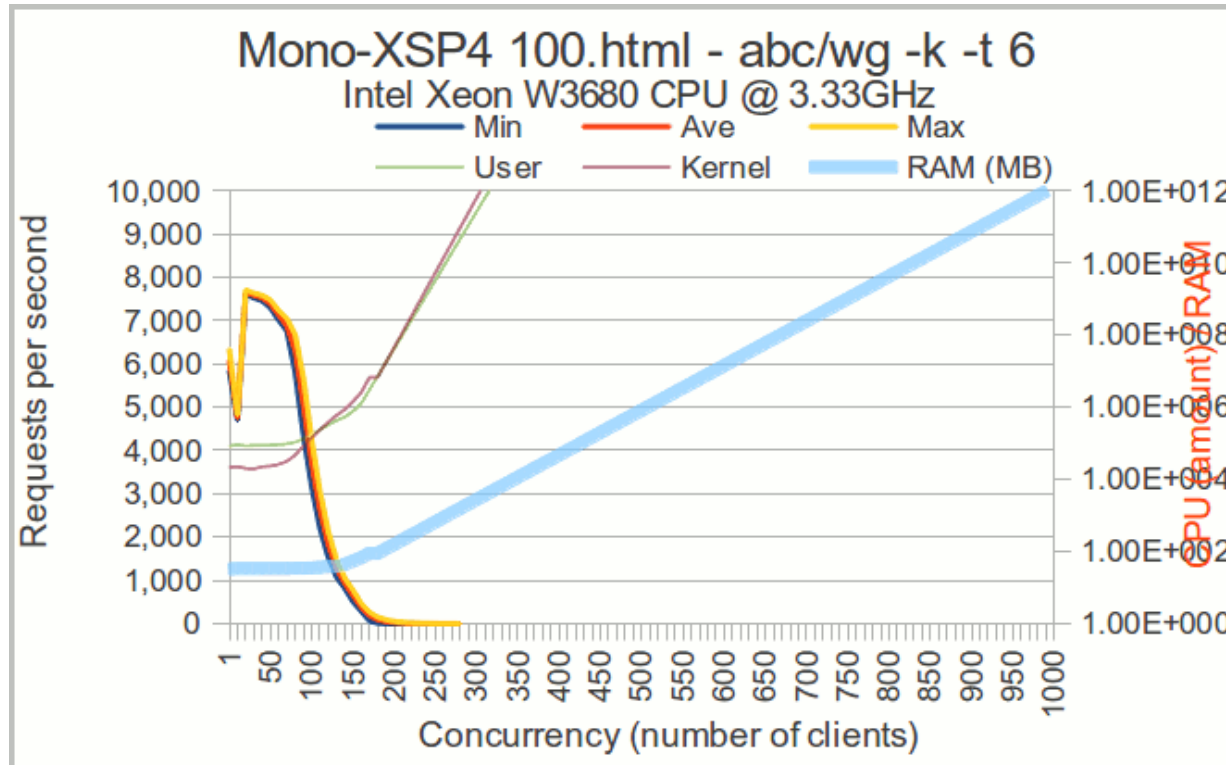
Apache TomCat – Java App. Server



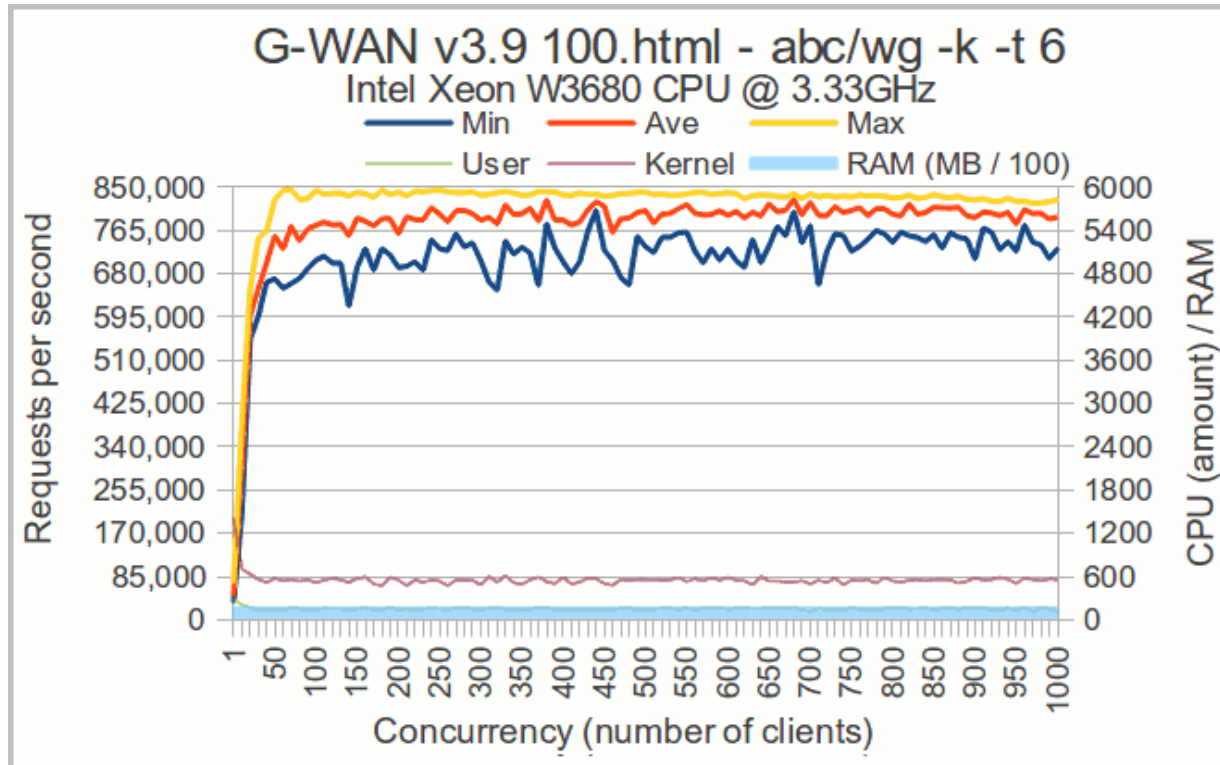
Caucho Resin – Java App. Server



Mono XPS – C# App. Server

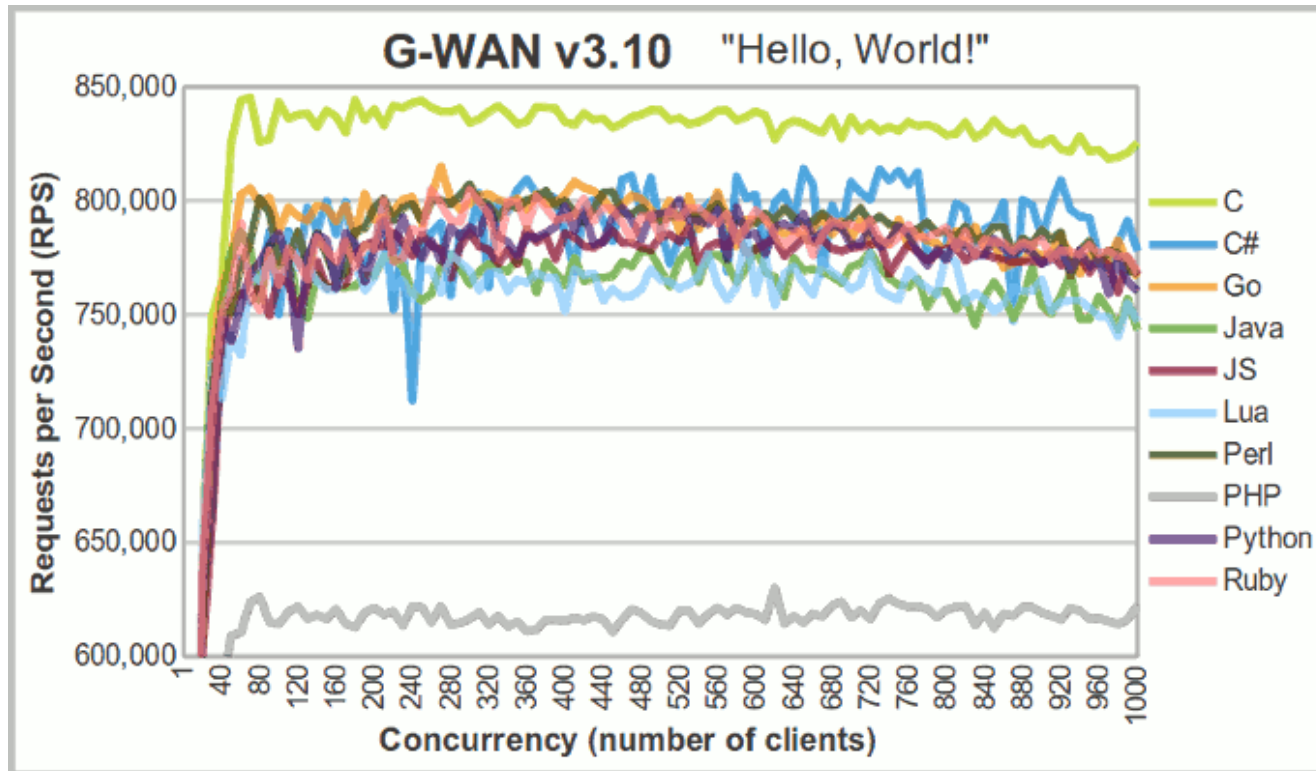


G-WAN – As A Mere Web Server



G-WAN – As A Web App. Server

asm, C/C++, C#, Objective-C/C++, D, Java, Scala, JS, Go, Lua, PHP, Perl, Python, Ruby, etc.



In A *Fraction* Of The Time

1 billion of HTTP requests on the [1-1000] concurrency range

100-byte (static file):

G-WAN	Average-RPS:826,821	Time: 1,516 seconds	[00:25:16]
Lighty	Average-RPS:219,562	Time: 4,740 seconds	[01:19:00]
Nginx	Average-RPS:167,977	Time: 6,823 seconds	[01:53:43]
Varnish	Average-RPS:103,996	Time:10,817 seconds	[03:00:17]

hello world (dynamic contents):

G-WAN/C	Average-RPS:801,585	Time: 1,551 seconds	[00:25:51]
G-WAN/Java	Average-RPS:759,726	Time: 1,648 seconds	[00:27:28]
G-WAN/JS	Average RPS:768,659	Time: 1,696 seconds	[00:28:16]
G-WAN/Go	Average RPS:784,113	Time: 1,892 seconds	[00:31:32]
Tomcat	Average-RPS: 76,556	Time:20,312 seconds	[05:38:32]
Node.js	Average-RPS: 14,209	Time:80,102 seconds	[22:15:02]
Go	Average-RPS: 12,801	Time:84,811 seconds	[23:33:31]

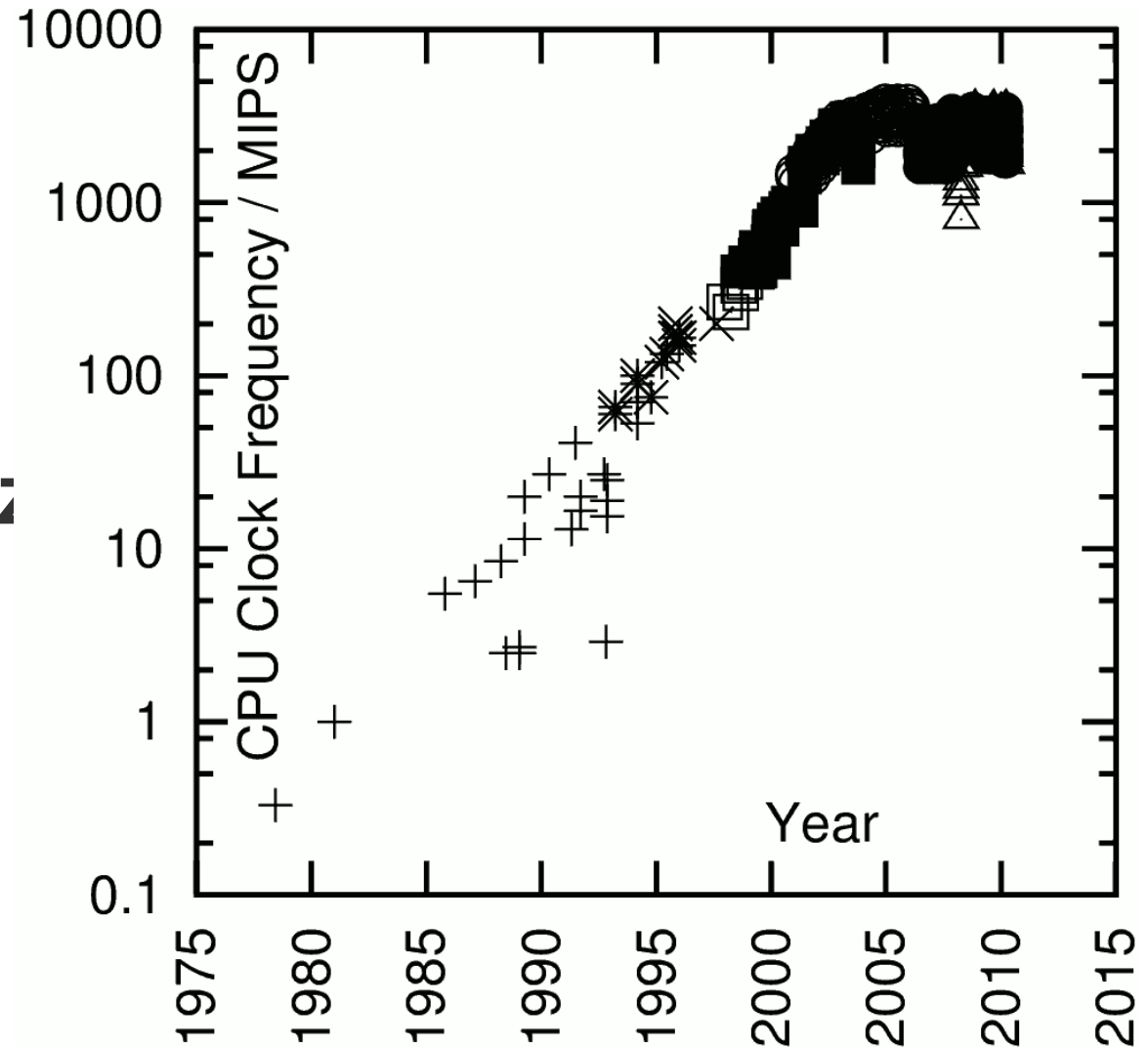
Scalability & Performance

By-Design

The CPU Freq. Halt

Since 2004,
CPUs run at 3GHz;

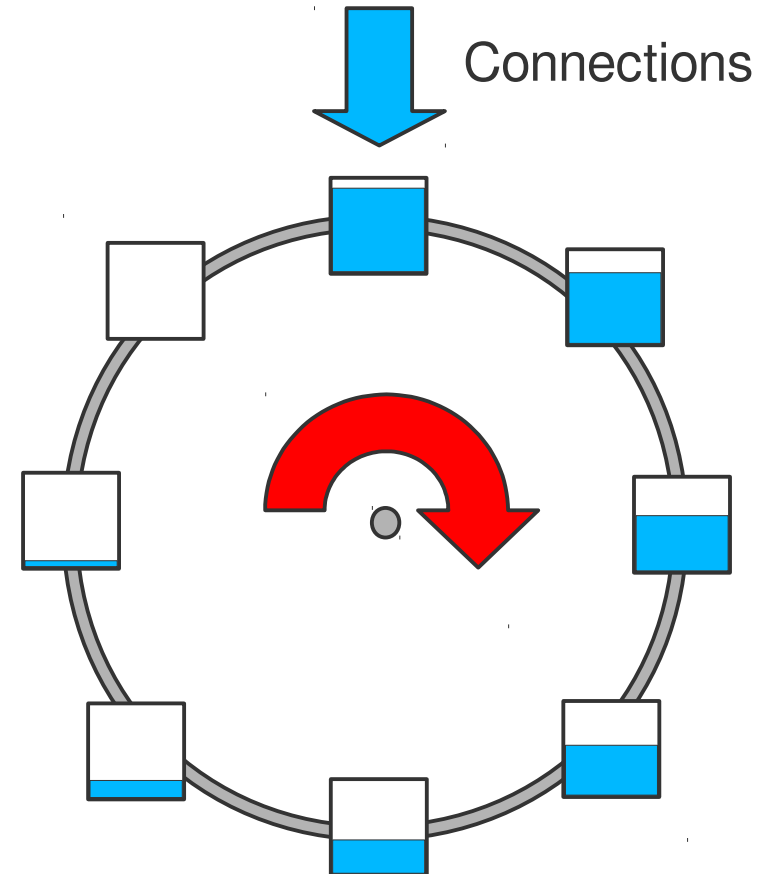
We should have
100GHz CPUs
today...



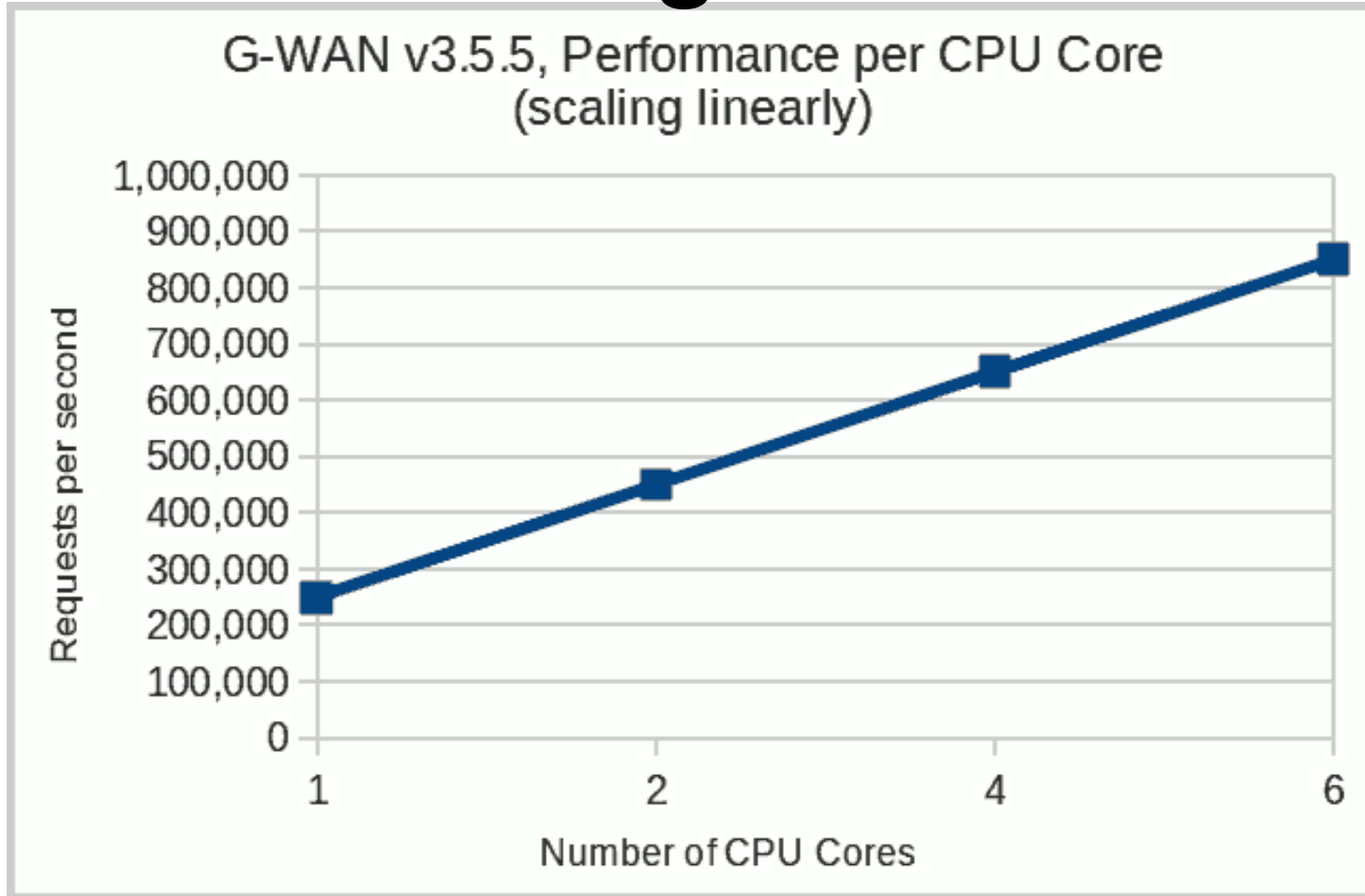
How: *Lorenz-Waterwheel*

Designed to **Scale**
From $[1-\infty]$ CPU Cores.

Lock-Free, Wait-Free,
Multi-Threaded *and*
Event-Based.

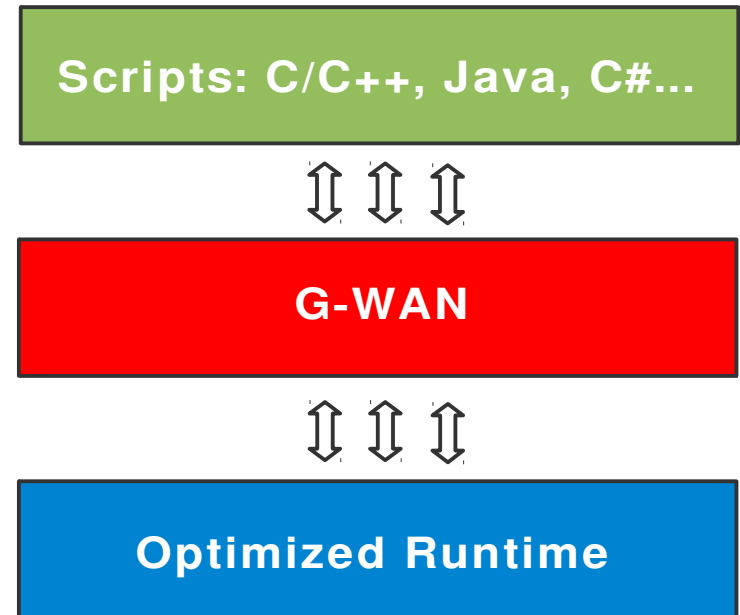


Result: Scaling on Multicore



How: A Custom Runtime

G-WAN's Runtime
Is Several Orders Of
Magnitude **Faster**
And **Smaller** Than
Linux's
System Runtime.



Greater Portability & Stability,
Speed-up Slow Languages.

Why Scale on CPU Cores

The Need For Efficiency:

- All Web/App. Servers Scale Horizontally
- Since 2004, CPUs Scale **VERTICALLY**
- Minimizing Resources Consumption

TWD's Projects Needs G-WAN On Both Sides
(Client and Server) without disturbing other tasks.

Scalability & Performance

Demo:

45,000 Persons

San Francisco

Social Network

ORACLE Open World 2012



Online Game Demo: **100 millions of bots** stored in an **ORACLE NoSQL Database**:

The **G-WAN server** runs this demo with a **CONSTANT** and very **LOW LATENCY**:



NETWORK

HTTP request time to travel
+ HTTP reply time to travel



SERVER

validate + parse HTTP request
+ build HTTP reply - DB time



DB

search of nearby bots
+ bots position updates

- Every 300 ms G-WAN updates 100m of records. Each request searches the 100m:
- G-WAN randomly updates 100 million of bots' position, direction and speed.
- Each client asks G-WAN a list of bots nearby their player to refresh their board.

Move the with the **arrow keys**. The spotlight represents the player's field of view that bots traverse randomly. This server-side G-WAN Web application works on a 4-Core server.

G-WAN

ORACLE Open World 2012

Making The Impossible Become Routine

- G-WAN Accelerating **ORACLE NoSQL**
- In A Social Gaming Demo Of **100 Millions Bots**
- All Moving In Real-Time (Heading, Speed, etc.)
- Queried by 45,000 Persons Joining The Game
- And Achieving A Whooping **1.2 Billion of TPS**
- ...On A Mere 6-Core Desktop Machine!

Core Design Philosophy

Simplicity Rules

(For Machines & Humans)

Fly On Servers & Mobile Platforms

Security

An App. Server That Can be Trusted

Designed To Build A Secure Platform:

- **Less Code, Less Bugs**
- **New Technologies (Parsing, Memory, etc.)**
- **No Vulnerability Found Since 2009 Launch**

Needed a Safe Server to release Secure Services.

Ubiquity

A Lightweight (200 KB) App. Server

Designed To Run Everywhere:

- **Smartphones** (Low-Consumption, Low-Latency)
- **Embedded** (Control At The Lowest Level)
- **Servers** (Web, SaaS, PaaS, Cloud services)

With Scripts In 16 Programming Languages:

(asm, C/C++, C#, Java, Scala, Go, Javascript, Lua, Perl...)

Interoperability

An Universal Stack

Open to Third-Parties:

- Applications (C/C++, C#, Java, Obj-C, Perl)
- Middleware (G-WAN, HTTP, SSL, etc.)
- Database (Key-Value, SQLite, ORACLE)

Zero-Configuration

An Unobstrusive Stack

Why Configuration Files Are Bad:

- Confusing, User Errors, Buggy, Version Incompatibilities
- Mostly Redundant with File System Information
- Inadequate: **Adaptive** Options Are Much Safer / Efficient

Safer, Faster, Simpler, No Pointless User Lock-In, Able to Run on Unattended Systems.

Proven

Industry Leaders



Use G-WAN to accelerate:

- **NoSQL** (ORACLE Open World 2012)
- **Big Data** (EON, Inc PaaS in California)
- **Streaming** (multimedia, transcoding)



Oracle OpenWorld
September 30 - October 4, 2012
San Francisco

Engineered for Innovation

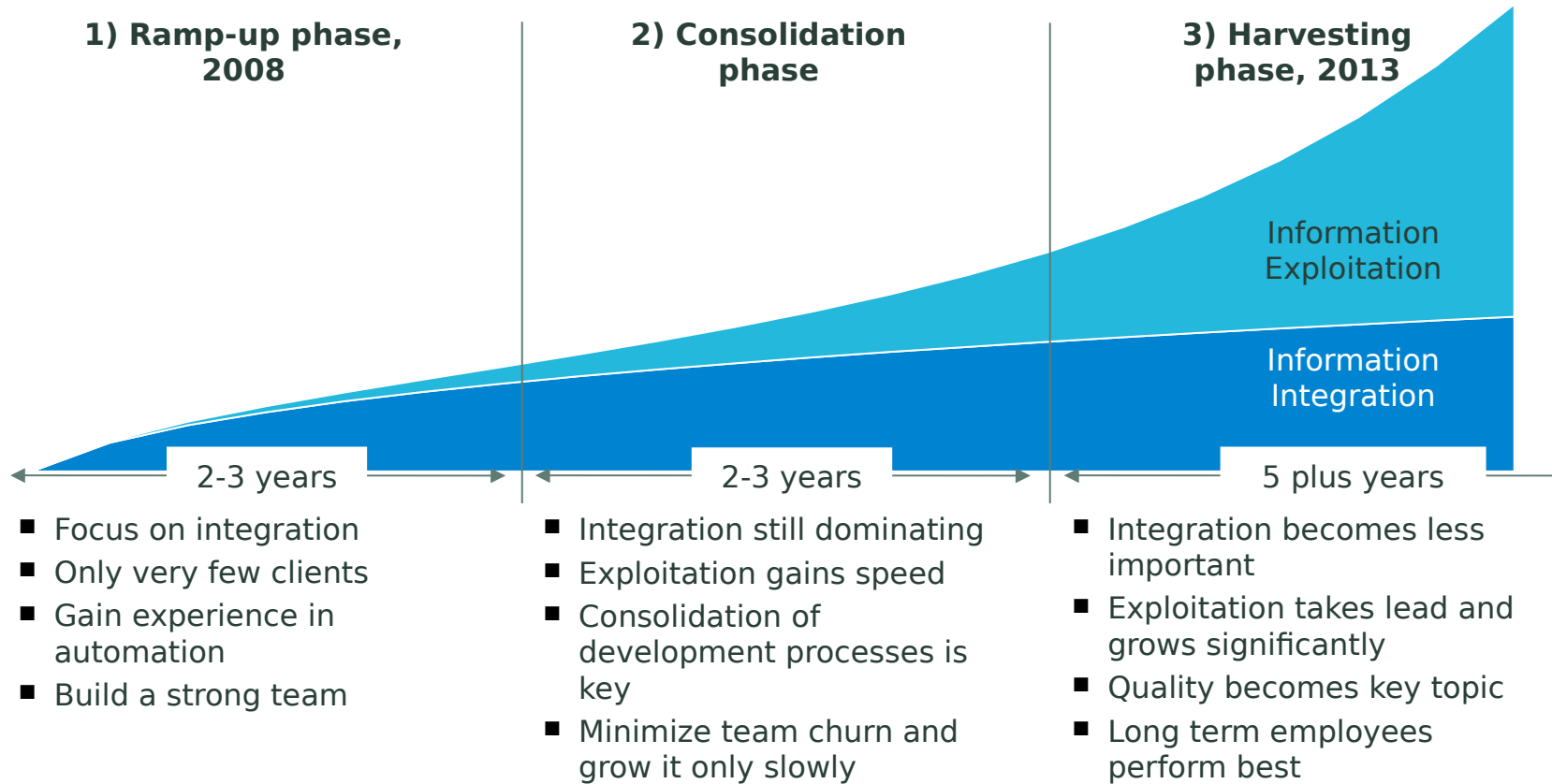
G-WAN

The G-WAN Project

Development

Schedule

Reaching The Harvesting Phase



Productivity Standards

Favourably Comparing With The Next Best:

Server	Birth	Files	Blank	Source Code Lines Comment	Code	Total
Nginx	2002	256	35,131	4,308	94,369	133,808
G-WAN	2009	171	11,198	42,706	56,766	110,670

G-WAN was written in less than half the time, and offers many more features in half the code of Nginx. Further, G-WAN's source code has 10x more comments than Nginx's code.

The TrustLeap Project

The Need For G-WAN

On Both

Server and Client Sides

Unbreakable Security

- *Future-Proof (I.e. QUANTUM Computers)*
- **Mathematically Proven (Can Be Trusted By All)**
- **Independent From Computing Power Used To Break It**
- **No More Need To Enlarge Encryption Keys**
- **No More Need To Change Encryption Algorithms**
- **Also Unbreakable Two & Three-Factor Authentication**
- **No Central Key Repository Needed (But Can Be Used)**
- **Mobiles / Embedded: Very Low CPU / RAM Overhead**

The Value Of Trust

Applications

- **Corporate Asset Protection (Patents, Talks, Databases)**
- **Public Asset Protection (e-Votes, Medical Records, Legal)**
- **International Negotiations (United Nations, Contracts)**
- **Transaction / Archiving Certifications (Indisputable)**
- **Defense (Impenetrable Communications, Drones, etc.)**
- **Chips Would Be Ideally Used (Tampering, I.P. Protection)**
- **Legitimacy to Impose A Licensing Monopole (Exclusivity)**

Trust Starts With Identity

- **Email (Data Protection, Negotiations, Board Talks)**
- **Routers / Firewalls (How Safe Are Barriers If Broken?)**
- **Transactions (Trading, Contracts, Non-Repudiation)**
- **Storage (Confidentiality, Tamper-Proof, Full-Control)**
- **Defence (Remote Presence / Control, Chain Of Orders)**
- **I.P. Rights (What Worth Is A Proof That Can Be Spoofed?)**
- **Legal (Customers / Lawyers / Regulators Security Chain)**

TrustLeap

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About TrustLeap

TrustLeap, the security division of TWD Industries AG, protects digital assets with **cryptanalytically unbreakable** technology (safe against unlimited computing power as it is proven mathematically that no key leaks can be exploited). The TrustLeap secure platform leverages offers of enterprise, cloud, networking, digital media and financial services in global strategic markets.

TrustLeap lets partners and users form dynamic ecosystems where duly accredited strangers can safely trust each-other. Establishing widespread trust enables organizations to secure their infrastructure, raise the value of their offers and safely market their digital assets.