胡小帆简历

基本信息

- 姓名：胡小帆
- 学历：惠州学院大学本科网络工程（2009年9月 - 2013年6月）
- 电话：+86 15224019502
- 邮箱：xiaofan.xhu@gmail.com
- GitHub: https://github.com/bom-d-van
- 博客： https://www.xhu.buzz/

我有近十年的互联网及软件开发和运维的工作经验，涵盖了前中后端，高可用，高流量分布式系统的开发和维护，既有从零到一实现项目的经验，也治理和拓展过大型分布式和复杂系统。

- 编程语言：Go, C, C++, Bash, Perl, Java, JS, Ruby, Python, Rust.
- 相关技术：Linux, TSDB (Graphite), SQL DB (MySQL/PostgreSQL), Kubernetes, Container/Docker, Redis, Ruby on Rails, EBPF, SLI/SLO, SRE, uWSGI, Puppet, Protobuf/GRPC, ReactJS/jQuery/Backbone/ExtJS/etc.

主要工作经验

2022年9月 - 现在 (元戎启行 中国深圳)

- 职位: 高级研发工程师
- 公司规模：400+研发
- 技术栈: Go, Kubernetes, Traefik, External-DNS/dnscmd, PKCS11, OpenTelemetry, Salt, Terraform, MAAS, AliCloud

主要经验:

- Kubernetes Infra
  - 通过dnscmd对接Windows DNS Server和External-DNS的rfc2136 provider的服务接口，实现K8S服务的域名在内网DNS服务器注册自动化
  - 将公司内部k8s项目使用的helm2升级到helm3，过程中需要设计和实现迁移逻辑和向后兼容现有部署逻辑
  - 通过Traefik IngressRoute实现微服务泳道功能
- Infra As Code (IAC) and GitOps
  - 设计和实现了通过saltstack同步管理车载系统和服务器系统的配置管理的Infra逻辑
  - 设计和实现了terraform dns provider用于管理内网和阿里云的内部域名
  - 拓展了terraform-maas支持更多的MAAS资源管理
- 设计和实现了一个MTLS服务代理，用于管理和使用通过nvpkcs11加解密的服务根证书和设备证书
- SRE duty: firefighting, server management, etc.
  - Debug K8S集群间的网络问题和IO问题（网卡固件bug和系统盘和数据盘无物理隔离）
  - Debug K8S服务的延时和连通性问题
- Artifact仓库管理 (Nexus和内部工具实现)
  - 管理托管于Nexus的Artifactory仓库，Debug各种服务问题和做水平扩容
  - 设计和实现一个更高性能的APT/Debian Package仓库(tinydeb)用于替换Nexus的APT仓库功能，有10倍以上的性能优化

2017年10月 - 2022年7月 (Booking.com 荷兰阿姆斯特丹)

- 职位：研发工程师/高级研发工程师
- 公司规模：2000+研发/10000+非研发
- 技术栈: Time Series Database, Go, Perl, C, Large Scale Distributed Systems, Site Reliability Engineering, Kubernetes, Helm, System Programming, Ansible, Puppet, Java

主要经验:

- 研发和维护高可用大型分布式时序数据库Go-Graphite（存储和查询方向）
  - 规模：1千多台服务器，PB级数据量(SSD)，5亿Unique Metrics (3 replicas)，2k+ QPS，3千万data points每秒的Ingestion
  - 设计和实现了基于Facebook的Gorilla论文中描述的Gorilla时序数据压缩算法的新存储文件结构，达到了30%-70%的压缩率。
  - 设计和实现了基于Russ Cox的DFA算法的Globbing查询算法的前缀树索引，实现了高性能的索引效率和低延迟的查询，支持单台服务器高效索引10-40 Millions Metrics。
  - 设计和实现了Lockless and concurrent 前缀树索引，减少了数据库内存消耗，支持实时索引新数据
  - 设计和实现了高性能的Quota子系统，减少了多租户系统中的Noisy Neighbour和实现有效资源管理和控制
  - 优化了集群Rebalancing tool，引入了基于health check的自调节速率机制，在避免导致服务器负载过高的情况下优化了sync的速率以及提高了系统可监控性。
- 扩展和维护高可用配置分发系统 (Scaling large scale distributed config management system)
  - 规模：8k RPS, 支持1300多个后端系统和6万多个客户端节点
  - 拓展API后端支持高并发和高可用
  - 定义和实行SLI和SLO，包括Availability, Propagation Latency, Error Rate, 后端系统请求分布情况等

    - 优化Perl客户端
- Site Reliability Engineering
    - 运维管理多个中小型后端系统(规模从10到100多台服务器)，debug和oncall各种生产环境问题
    - 实现了针对公司内部envoy控制面的自动压测系统
    - 实现了uwsgi上超时回调机制用于收集线上系统异常时间和日志：Graceful Harakiri
    - 研发和使用EBPF工具debug在线上产系统问题
    - Debug和解决了Hashicorp Vault生产系统的存储泄漏的Bug
- 研发和拓展新fast partner signup channel

2016年9月 - 2017年8月 (UCloud 中国上海)

- 职位：研发工程师
- 公司规模：500+
- 技术栈: Go, Bash, C++, Linux, TC, Networking, DPDK

主要经验:

- 维护和研发公司云平台的基于Linux tc的流量控制系统。
- 研发了带宽操作的对账系统。
- 使用Quagga和Keepalived实现了Redis的跨机房高可用
- 研发新的ingress流量控制下发服务
- 研发数据一致性检测的脚本和错误日志监控

2013年5月 - 2016年8月 (The Plant 中国杭州/日本东京)

- 职位：研发工程师
- 公司规模：50+
- 技术栈: Go, Bash, Ruby on Rails, Linux

主要经验:

- 研发和维护了两个电子商务相关的项目
    - 调研和实现了一个3D Bin Packing算法，自动化了打包成本计算并优于人工结果
    - 集成基于Mahout的产品推荐算法
    - 对GMO和Stripe的订单和支付系统的集成
    - 用户注册登陆，产品管理模块的研发
    - 生产系统的内存泄露问题的调查和解决
    - 单元测试和集成测试
    - 基于React的前端开发
- 办公协作系统Qortex的部分功能的开发
    - 基于Virtual Box的企业版系统的打包和部署的自动化
    - 开发和部署的自动化
    - 基于SMTP和Beanstalkd的邮件系统的集成和处理
    - 基于Ejabberd聊天子系统的集成和开发

2010年5月 - 2013年2月 (惠州学院Wando实验室)

参与两个ERP系统的设计和研发。主要技术栈是Ruby on Rails和ExtJS。

开源项目

- Go-Carbon: Graphite Storage in Go.
- Harp: A Go application deployment tool.
- 3D Bin Packing: A Golang 3D Bin Packing Implementation
- AssetTube: A tool for fingerprinting and serving asset files for Go Web applications.
- CHTTP: A stupid and incomplete http/http2 C implementation, built for learning C.
- plperf: A tracing program for uwsgi+perl environment, using ebpf and perl dtrace, in Go.
- Pak: A Go package version management tool.

Xiaofan Hu's Resume

Summary

- Name: Xiaofan Hu
- Email: xiaofan.xhu@gmail.com
- Phone: +86 15224019502
- GitHub: https://github.com/bom-d-van
- Blog: https://www.xhu.buzz/

I'm seasoned and humbled software developer, with extensive experiences and skills of building systems (be it web applications or low level system tooling). I like solving hard problems and I enjoy meaningful works. I'm easy to talk to, extremely communicative, and supportive of colleagues and company strategies.

- Programming languages: Go, C, C++, Bash, Perl, Java, JS, Ruby, Python, Rust.
- Tech: Linux, TSDB (Graphite), SQL DB (MySQL/PostgreSQL), Kubernetes, Container/Docker, Redis, Ruby on Rails, EBPF, SLI/SLO, SRE, uWSGI, Puppet, Protobuf/GRPC, ReactJS/jQuery/Backbone/ExtJS/etc.

September 2022 - Now (Deeproute.ai Shenzhen, China)

- Title: Senior Developer
- Company scale: 500+
- Tech: Go, Kubernetes, Traefik, External-DNS/dnscmd, PKCS11, OpenTelemetry, Salt, Terraform, MAAS, AliCloud

Achievements:

- Kubernetes Infra
  - Integrated Kubernetes Ingress DNS name registration in Private DNS server
    - Implemented a DNS server (as the rfc2136 provider for external-dns) running on a windows DNS server
  - Implemented infra and migrations logics of helm2 to helm3
  - Implemented microservice traffic routing (dabbed as "swimlane") using traefik IngressRoute on Kubernetes.
- Infra As Code (IAC) and Gitops
  - Implemented the infra IAC logics using saltstack for managing both on-board systems on autonomous vehicles and servers
  - Implemented a terraform DNS providers for DNS records provision
  - Extended the MAAS terraform provider to improve our internal IAC management process.
- Implemented a MTLS proxy daemon, root and device certificate protection using nvpkcs11.
- SRE duty: firefighting, server management, etc.
  - Identified and resolved a networking issues between 2 Kubernetes clusters (traced down packets being dropped on the client side due to NIC firmware bugs)
  - Debugged latency and connectivity issues of artifact repository tools like nexus and harbor
- Artifact Repository Management (Nexus and internal tooling)
  - Manage and scale nexus infra
  - Design and implemented a scalable apt/debian package repository (tinydeb)

October 2017 - July 2022 (Booking.com Amsterdam, Netherlands)

- Title: Developer/Senior Developer
- Company scale: 2,000+ Tech/10,000+ Total
- Tech: Time Series Database, Go, Perl, Large Scale Distributed Systems, Site Reliability Engineering, Kubernetes, Helm, System Programming, Ansible, Puppet, Java

Achievements:

- Scaling large scale distributed time series systems (Graphite)
  - Scale: 1k+ servers, 1+ PB SSD storage, 500+ million uniq metrics, 2k+ QPS, 30m+ data points per second on ingestion.
  - Research, design and implement a new file format that enables compression, based on the Facebook Gorilla compression algorithm and achieves the disk space usage reduction of 30% - 70% (different cluster behaviors differently).
  - Design and implementing a new index algorithm by adopting NFA+DFA algorithms introduced by Russ Cox that is able to support 10 - 40 millions uniq metric paths with low indexing overhead and low tail latencies.
  - Design and implement a lockless and concurrent trie indexing that were able to reduce memory usage and supports real time indexing
  - Design and implement a highly performant Quota subsystems that is able to reduce the noisy neighbor effect in a multi-tenant environment and achieves efficient resource management and control
  - Optimize the rebalance tool for the systems, by introducing a self-regulated mechanism using health check and jitters, the changes has produced faster and adjustable sync rate and enhances observability.
- Scaling and maintaining a large scale distributed config management system
  - Scale: 8k RPS, 1300+ backend systems and 60k+ client end points depending on the system
  - Scaling the API backend to support high concurrency and high availability
  - Define and implement SLI and SLO metrics, including Availability, Propagation Latency, Error Rate, Request distributions across different backends and roles, etc.

    - Optimize Perl clients
- Site Reliability Engineering
    - Maintain multiple medium and small backend roles (servers ranging from 10 to 100s), debug production issues and being on-call.
    - Design and implement an internal auto-capacity testing system targeting envoy based systems by interacting with an internal control plane API.
    - Design and implement an uWSGI timeout callback mechanism for logging automation that's called Graceful Harakiri.
    - Research and implement EBPF based tooling for debugging production issues
    - Debug and resolve a storage leakage Bug in Hashicorp Vault production system.
- Develop and scale a new fast partner signup channel/product.

September 2016 - August 2017 (UCloud Shanghai, China)

- Title: Web Development Engineer
- Company scale: 500+
- Tech: Go, Bash, C++, Linux, TC, Networking, DPDK

Achievements:

Maintain and develop the traffic control system which is an important part of networking control, using C++, Go, Bash etc.
Responsibilities and Experiences included:

- Develop an accounting system for bandwidth usage monitoring and operations
- Use Quagga and Keepalived to implement Redis high availability across different data centers in the same region
- Develop new ingress traffic control feature in
- System problems on-call, writing up scripts for data consistency checking and log error monitoring

May 2013 - August 2016 (The Plant Hangzhou, China/Tokyo, Japan)

- Title: Developer
- Company scale: 50+
- Tech: Go, Bash, Ruby on Rails, Linux

Achievements:

- Mainly worked and maintained two EC projects in Go and a few other smallish projects like product recommendations (by using Mahout), and a react project. Responsibilities and Experiences included:
    - Research and implement a 3D Bin Packing algorithm and achieves optimized packaging cost estimation
    - Order and Payment(first GMO, then migrated to Stripe) User register/login, products management
    - Memory leak problem fixes
    - Unit/Integration tests
    - System deployment and maintenance etc
- Worked on Qortex, a communication platform designed and made for high performance teams. Experiences and Personal highlights included:
    - VirtualBox Packaging with auto-updates support for Enterprise users
    - Go package management (Pak)
    - Deployment/migration automation script (developed later into Harp)
    - Email processing/sending (Beanstalkd, SMTP)
    - Chatting (Ejabberd Integration) API maintenance

May 2010 - Feb 2013 Student Developer in Wando Lab, HuiZhou University

Involved in the design and development of two ERP (Enterprise Resource Planning) systems in RoR and Ext JS. It's a great learning experience and an excellent environment for helping improve programming and collaboration skills.

Open Source Projects

- Go-Carbon: Graphite Storage in Go.
- Harp: A Go application deployment tool.
- 3D Bin Packing: A Golang 3D Bin Packing Implementation
- AssetTube: A tool for fingerprinting and serving asset files for Go Web applications.
- CHTTP: A stupid and incomplete http/http2 C implementation, built for learning C.
- plperf: A tracing program for uwsgi+perl environment, using ebpf and perl dtrace, in Go.
- Pak: A Go package version management tool.

Education

Bachelor of Network Engineering, from September 2009 till June 2013, at Huizhou University of Guangdong China.