

Shijie Xu

shijie.xu.work@gmail.com | Beijing, China

Short Words

- 10-year experiences in building software systems, focusing on system concurrency, high throughput, and reliability.
- 6-year experiences on programming language run-times(J9/OMR, JRuby, Erlang Beam, and Ehtereum VM), focusing on JIT compilation, Graph Compilation, memory and concurrency
- 4-year experiences in enterprise level web SaaS system for identification.

Experiences

- 2021, Mar- now, Architect, **AdvanceAI**, Beijing

As a tech leader&architect for platform team, I

- design and build architecture of Onestop Orchestration Platform(OSP) from scratch, an Enterprise-Level Web SaaS to enable financial customers setup business workflows to conduct AML&KYC&KYB, and fulfill financial regulation in Southeast Asia countries. OSP achieved initial four angel customers with SLA 99% after MVP.
- setup and manage platform team up to 25 engineers and QAs, ensuring they stay on track to meet team goals and deadlines, while also providing guidance and mentorship to help them develop their skills.
- Responsible for complete Service Organization Control (SOC2) audit.
- As a motivated engineer with passions for new ideas and technologies, I have built Proof of Concepts (POCs) for Decentralized Identifiers (DID), Zero-Knowledge Proofs (ZKP), and Knowledge Graphs with ChatGPT. These tools have been used for risk identification and anti-money laundering(AML).

- 2017, Dec -2021, Mar, Sr. Architect, **VIPKID**, Beijing

I have been in business architecture, E-Commence, and EDU departments during three years, and my responsibilities mainly cover system building, SRE, and innovative project incubation.

- Pioneered, launched, and led Education-Intelligence project, including real-time EDU data warehouse, recommendation system, knowledge graph center, real-time big data processor and algorithm models, for adaptive learning with the goal of measuring and improving education quality. The project involved 6 teams in KID and gained 7% score increment on TOEFL Primary Test.

- a) Led a four-member team, and built Goods-Platform and Order-Platform from scratch. Both projects supported all existing KID subsidiaries, and reduced engineering efforts from two weeks to 2 days for new sale strategies; b) Directed and re-engineering E-Commerce system&Learning-Center (Px Services) in DamiWangxiao, and achieved 6x QPS speedup; c) Designed and implemented lock-free datasyn system that united data from heterogeneous sources into mid-goods database, and this provided a core prototype for real-time data warehouse in EI platform;
- As one of core leaders for VIPKID stability construction, I designed the overall stability solution and promoted solution across the whole RD teams, and achieved 99.92% SLA after one year. Meanwhile, I designed, implemented–full-stack– Minimal Value Product(MVP) ecosystem that monitored and secured online student classes to against any failure (e.g., system and cloud failure) in the VIPKID’s critical service chain. MVP rescued 0.5+ million student’s classes and achieved 92% Rescued Rate in 2018. To handle traffic volume that original critical services with 600+ instances handled in 10 minutes, the core service with 3 instances in MVP only accomplished it within 30s.
- Hiring, team setup and engineering culture building.
- 2013–2017 PhD and Research Assistant, **IBM Centre of Advanced Studies**, Canada

Research on runtime for dynamic type programming languages and focus on graph compialtion and code generation&optimization (and also for GPU); Analyzed JSR292(Supporting Dynamic type languages on JVM) implementation in J9, and proposed and implemented following ideas:

 - Profiling and Data Mining. Built tools to capture method handle graphs created by dynamic language interpreters, and to mining frequent patterns and equivalences.
 - *Metis* A memory allocator that profiles GC information, and places objects in contiguous groups when these objects are likely to be recycled together. It reduces memory fragmentation by 40+% and GC overhead.
 - *MHDeS* A system that constructs graph index keys to identify and deduplicate equivalent method handle graphs at program runtime, for the purpose of language interpretation speedup (5%) and JIT efficiency (e.g., earlier JIT and less JIT).
 - *GraphJIT* A bytecode JIT compiler that simplifies a graph by fusing its internal nodes and uses the compiled version to replace the source graph for execution. It applies to JSR292 in J9, and speeds up JRuby by 7+% and JIT compilation effort.
 - Research on supporting parallel stream with GPU, and delivered a prototype that jit *invokdynamic* into NVVM IR for parallel steam API in Java 8.
 - Assist to review **JVM Specification for Java 8** on *invokedynamic* part and research RISC-V.
 - Teacher assistant
- 2010–2013 Tech Leader, **Yottaa Inc**, Beijing.
 - Designed and built Yottaa platform system from scratch with my colleagues; helped company complete series B and C rounds and initial customers.
 - Explored various opportunities to speed up customer’s sites from low level network protocols to high level data content optimizations; proposed and delivered Yottaa multi-cache, content optimization, cloud scaling and load balance.

- Operated two-member monitor team that captured and analyzed sites’ performance data; coordinated with platform and UI teams; and delivered scripting monitoring system and daily measure data mining successfully.
- 2007–2010 team leader, **Alcatel-Lucent**, Beijing
 - Responsible for Wireless Interface Control Language(WICL) language implementation.
 - Upgraded WICL framework from CORBA BOA to POA;
 - Research Tcl Interpreter and built CorbaTcl to enable the interpreter support CORBA dynamic invocations and dynamical type system for WICL system.

Education

2017 **CS, Ph.D., University of New Brunswick. Canada**

2007 **CS, M.Sc., Tsinghua University, China**

2004 **CS, B.Sc. NorthWest University, China**

Publications

1. Shijie Xu, David Bremner, Daniel Heidinga, **Fusing Method Handle Graphs for Efficient Dynamic JVM Language Implementations**, In Proceedings of the 9th ACM SIGPLAN International Workshop on Virtual Machines and Intermediate Languages (VMIL 2017). Vancouver, BC, Canada — October 24 - 24, 2017.
2. [SCI]Lingfang Zeng, Shijie Xu, Yang Wang, Kenneth B. Kent, David Bremner and Chengzhong Xu, **Toward cost-effective replica placements in cloud storage systems with QoS-awareness**. Softw. Pract. Exper (2016).
3. [SCI]Lingfang Zeng, Shijie Xu, Yang Wang, **VMBackup: an efficient framework for online virtual machine image backup and recovery**. Concurrency and Computation: Practice and Experience 28(9): 2630-2643 (2016).
4. Shijie Xu, David Bremner, Daniel Heidinga, **MHDeS: Deduplicating Method Handle Graphs for Efficient Dynamic JVM Language Implementations**. In Proceedings of the 11th Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS’16) with ECOOP’16, 18 July 2016 Rome, Italy.
5. Shijie Xu, David Bremner, Daniel Heidinga, **Mining Method Handle Graphs for Efficient Dynamic JVM Languages**, In ACM proceedings 12th Conference on Principles and Practices of Programming on the Java Platform: virtual machines, languages, and tools (PPPJ’15) , Melbourne, Florida, USA.
6. Shijie Xu, Qi Guo, Gerhard Dueck, David Bremner, Yang Wang, **METIS: A Smart Memory Allocator Using Historical Reclamation Information**. In Proceedings of 10th Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS’15) with ECOOP’15, 5 - Fri 10 July 2015 Prague 1, Czech Republic.
7. Lingfang Zeng, Shijie Xu, Yang Wang, **Monetary-and-QoS Aware Replica Placements in Cloud-Based Storage Systems**, 2014 IEEE 6th International Conference on Cloud Computing Technology

and Science, Singapore, 2014, pp. 672-675.

8. Chi-Hung Chi, Shijie Xu, FengLin Li, Kwok-Yan Lam, Selection Policy of Rescue Servers Based on Workload Characterization of Flash Crowd, 2010 Sixth International Conference on Semantics, Knowledge and Grids, Beijing, 2010, pp. 293-296.
9. [SCI]BangYu Wu, Chi-Hung Chi, Shijie Xu, Ming Gu, JiaGuang Sun, Fast Service Selection Based on Multi-Dimensional QoS Requirements Reference Vector, Journal of Computer and System Technology, Volume 24, Number 2, March 2009.
10. Shijie Xu, Chi-Hung Chi, Cheng Qian, Chen Ding, Selection Strategy of Rescue Servers Under Hot-Spot Congestion, 2009 Fourth International Conference on Internet and Web Applications and Services, Venice/Mestre, 2009, pp. 468-473.
11. Shijie Xu, Chi-Hung Chi, Dynamic resource allocation strategy to handle hot-spots, 2008 Third International Conference on Communications and Networking in China, Hangzhou, 2008, pp. 312-316.
12. Bangyu Wu, Chi-hung Chi, Shijie Xu. Service Selection Model Based on QoS Reference Vector, 2007 IEEE Congress on Services (Services 2007), Salt Lake City, UT, 2007, pp. 270-277.
13. Gui Li, Shijie Xu, Qingyan Dong. On the Body Outline of Condensed Information. Journal of Shaanxi Normal University, Philosophy of science edition Vol. 31 Sup 2003.
14. Gui Li, Shijie Xu, Qingyan Dong. A new mathematical model for evaluating CUMCM Papers. Journal of Shaanxi Normal University, Philosophy of science edition Vol. 31 Sup 2003.

Selected Patents

1. Shijie Xu; Hui Wang; Xiuhui Han, Learning effect display method and device and computer storage medium, 202110350123.8
2. Shijie Xu; Xianglong Meng; Wei Zhao; Yajun Wang, Data Access method and device, storage, medium and Server, 201910563384.0 (2021-2 granted)
3. Shijie Xu, Daniel Heidinga, and David Bremner. Method Handle Just-in-time compilation from bytecode to bytecode for efficient native just-in-time compilation. US10649797B2(2020-05 granted)
4. Shijie Xu, Daniel Heidinga, and David Bremner. Online Method Handle Deduplication System for Dynamic JVM Language Implementations. US10649797B2(2020-5 granted)
5. Shijie Xu, Qi Li, Xuefeng Song. Data Migration in a Storage Network. PCT/CN2013/078576, JP2016528598A, CN105359481, US-9444891.(2015-01 granted)
6. Shijie Xu, Qi li, Xuefeng song. Meta-app to Depict Cloud Environment Dependencies to Faciliate a Service Environment Rebuild. CN104272704, KR101617116B1, US-9118677,PCT/CN2013/078576(2015-8 granted)
7. Shijie Xu, Qi Li, Xuefeng Song. Formation of Guilds in a Cloud Computing Environment. PCT/CN2013/078578 KR20160027055, US9455868(2015-1 granted)
8. Shijie Xu, Qi Li, Xuefeng Song. Virtual Machine Migration Based on Communication from Nodes. CT/CN2014/079736, WO2015188346, US9578131 2017-2 granted
9. Shijie Xu, Xuefeng Song. Parting Data to Improve System Performance. PCT/CN2012/079407,CN104508636, US20140337288(2014-2 granted)
10. Shijie Xu, Qi Li, Xuefeng Song. Compilation of Application Into Multiple Instruction Sets for a Heterogeneous Processor.PCT/CN2014/074114, WO2015143641(2014 granted)
11. Shijie Xu, Qi Li, Xuefeng Song. Data Cache on a Cloud Platform. US20150312368 (2015-5 granted)

12. Shijie Xu, Jie Chen, Qi Li, Xuefeng Song. Scene Image Generator. PCT/CN2014/088281, WO2016054800, US20160253832
13. Guang Yao, Shijie Xu, Qi Li Xuefeng Song, Malicious Virtual Machine Alert Generator. US9819690B2(2017-3 granted)
14. Guang yao, Shijie Xu, Xuefeng Song, Network Controller Security Monitor. WO2016106480, US9781042B2 (2017-10 granted)

Reviews

- IEEE Transactions on Parallel and Distributed Systems (TPDS) (2017, 2018, 2019)
- IEEE International Symposium on Rapid System Prototyping (RSP) (2017, 2018)