Blockchain Projects BV
Zutphenseweg 6
7418 AJ Deventer
The Netherlands
Chamber of Commerce: 697 131 38

www.blockchainprojectsbv.com
info@blockchainprojectsbv.com
Skype: annemieke.dirkes

Interim report for worker 2017-12-infrastructure
07.03.2018

The infrastructure worker has now set up three nodes for the mainnet

wss://eu.nodes.bitshares.ws
wss://us.nodes.bitshares.ws
wss://sg.nodes.bitshares.ws

and one node so far for the testnet

wss://testnet.nodes.bitshares.ws

They are already integrated into the web wallet and appear under Settings -> Access. The additional nodes for this worker were available earlier than planned, merely the additional milestones and change of domain delayed this report. Please find the original roadmap, the detailed deliverables and updated timeline of this worker below. This report includes deliverables of the interim report, possibly updated. Consider the interim report obsolete. All changes done to the original deliverables are highlighted. Please find additional comments through community feedback at the end of this report.

Maintenance for the nodes will still be done and published in a report after this workers runs out.

Please note that the old *.bitshares.works addresses are deprecated and will be deactivated in the future. This domain will be reused for **how.bitshares.works** for the technical documentation done via the documentation worker.

Original Roadmap

https://github.com/blockchainprojects/2017-12-infrastructure/blob/master/Roadmap_2017-12-infrastructure.pdf

Milestones Deliverables

1. Integrate and deploy faucet

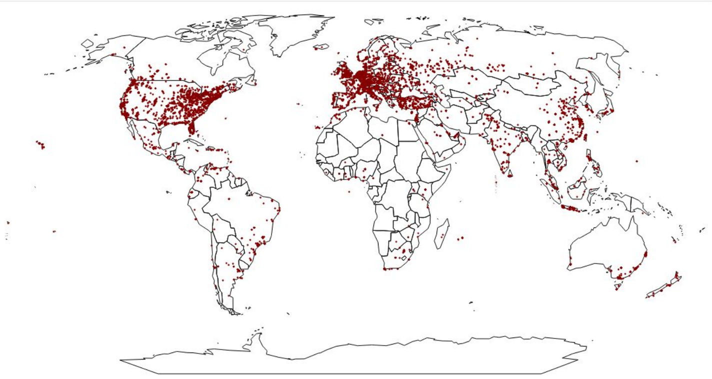
   Details of the onboarding account

   https://wallet.bitshares.org/#/account/onboarding.bitshares.foundation/permissions

   Details of the newly created accounts

   https://bitshares.eu/referral/onboarding/onboarding.bitshares.foundation

   As of now 38499 accounts were created with 313 life time upgrades, distributed as indicated below

   The faucet was initially funded by the worker with 25,000 BTS. These funds have been earned back since and were returned to the worker budget. Right now the account holds an additional 16,751 BTS with 23,288 BTS left to claim from the fee pool.

   https://wallet.bitshares.org/#/account/onboarding.bitshares.foundation/vesting

   The faucet is running smoothly since its deployment and can be considered self-sustainable if the usage continues.

2. Develop docker containers

   A docker-compatible deployment has been developed and integrated into BitShares-core. This feature will be available with the next release (which will be a non-hardfork release as per the core developers).

   https://hub.docker.com/r/bitshares/bitshares-core/

   As of right now, the nodes use the bitshares/bitshares-core:2.0.180202 image. We further added integration into docker-hub which automatically builds docker-containers with every tag produced on the bitshares-core repository.

   https://cloud.docker.com/app/bitshares

3. Develop orchestration tooling

   Automated deployment tools are setup with ansible. We have made significant progress on the orchestration tooling which comes with the following stack of software:

   - bitshares-docker
   - Bitshares-healthchecker
   - haproxy
   - certbot/letsencrypt
   - munin monitoring
   - nagios monitoring

4. Develop loadbalancer

   Loadbalancing and monitoring is realized with HAproxy, munin. Its configuration file is available

   https://github.com/blockchainbv/bitshares-infrastructure

   A BitShares blockchain health monitor is also included, which is available under the above link as well. The blockchain health and basic HAproxy statistics are available for every nodes by adding doing a http query to the stats route of the nodes, e.g.

   http://eu.nodes.bitshares.ws/stats

5. Test deployment and loadbalanced nodes

   Internal testing is completed and connection reliability is monitored. There is a connection issue with the web wallet (“Node out of sync”) that has to be investigated, but the nodes seem to be unaffected by this issue (no significant load when such connection issues appear). There might be a connection management problem inside the backend or the web wallet, but this lies outside the scope of this worker.

6. Public nodes with load balancer in the U.S. on separate servers for redundancy

   Three machines are deployed. One runs the loadbalancer (hosted by linode), two run normal nodes (hosted by linode and AWS).

   https://us.nodes.bitshares.ws/stats

7. Support SSL encryption on the load balancers

   All backend endpoints support SSL encrypted connections. The SSL certificates are obtained through the Let’s Encrypt Program.

   The premium SSL certificate is not obtained, since the above mentioned certificates are sufficient. This was a cost-benefit decision.

8. Public nodes with load balancer in Asia on separate servers for redundancy

   Two machines are deployed, which is a change to the original plan. One runs the Loadbalancer and one runs a normal node (both hosted by linode). A third one will be added once a suitable hoster is selected.

   https://sg.nodes.bitshares.ws/stats

If traffic increases significantly on this loadbalancer, additional nodes can be deployed. This was a cost-benefit decision due to the price of asian dedicated hosts.

9. Include testnet nodes on those machines

   We decided to use separate dedicated machines for the testnet. This decision was made to account for possible stress testing or other load heavy usage of the testnet, which should not interfere with the mainnet. For the testnet one machine is deployed that runs the loadbalancer and the node together (hosted by Hetzner).

   https://testnet.nodes.bitshares.ws/stats

10. Additional milestone: Public nodes with load balancer in Europe on separate servers for redundancy with elastic search

    An additional european node is set up, which was first used as our internal test framework. It ran smoothly and the server costs are low, therefore we decided to keep it for this worker. It runs four machines, one for the loadbalancer, two for normal nodes and one additional node with elastic search plugin (all hosted by Hetzner).

    https://eu.nodes.bitshares.ws/stats

    An elastic search node has been deployed separately and is only available for development purposes right now. Please contact info@blockchainprojectsbv.com if you are interested in using it.

Updated Timeline

2017-12-infrastructure		**2017**				**2018**								
		DEC				**JAN**				**FEB**				
Deliverables	**Duration**	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W5
Time		🟦	🟦	🟦	🟦	🟦	🟦	🟦	🟦	🟦	🟨	🟨	🟨	
Milestone 1	**1 w**		🟦											
☐ Account management	1 w		🟩											
☐ Integrate and deploy faucet	1 w		🟩											
Milestone 2 and 3	**1 w**					🟦								
☐ Develop BitShares Container	1 w					🟩								
☐ Orchestration	2 w					🟩								
Milestone 4 and 5	**2 w**					🟦	🟦							
☐ Develop Loadbalancer	2 w					🟩	🟩							
☐ Inhouse test	1 w						🟩							
Milestone 6 and 7 and 10	**5 w**						🟦	🟦	🟦			🟨	🟨	
☐ Deploy BitShares Nodes	2 w						🟩	🟩						
☐ Deploy Loadbalancer	1 w							🟩						
☐ Letsencrypt Certificate	1 w						🟩							
☐ Premium Certificate	1 w								🟩					
☐ Deploy EU node with ES	2 w								🟩			▨	▨	
Milestone 8	**1 w**								🟦					
☐ Deploy BitShares Nodes	1 w								🟩					
☐ Deploy Loadbalancer	1 w								🟩					
Milestone 9	**1 w**									🟦	🟨			
☐ Deploy Testnet Node	1 w									🟩	▨			
Annotations		Milestone 10 was added												

Please note that the durations are merely giving indicating the time period in which the underlying deliverable. It is not indicating the required workload.

Additional comments through community feedback

- Non-commercial use of the infrastructure nodes is ensured per disclaimer only
- The health monitor script misreports downtime due to looking into the maintenance interval
- Due to an issue in HAproxy we forced SNI. IP addresses never validate with any SSL certificate as it has no FQDN
- The deployment of the nodes is always the same: The latency to the loadbalancer cannot be improved, the increased latency from the loadbalancer to the backend nodes can be seen in the stats page. This setup allows new backend nodes to be dynamically added to increase capacity the loadbalancer. To improve this, we could either change the specifications of websockets to allow redirects (probably won't happen), or add another layer to the whole thing to identify the location of the best possible loadbalancer near you. This raises the question why multiple loadbalancers at all? First, for redundancy, second the whole need for multiple loadbalancers is an issue with websockets. If we were HTTP-only, we could let the loadbalancer redirect requests geo-locationally, but that is not possible for websockets.
- The reduction of the asian nodes from 3 to 2 is a temporary decision that was caused by the linode nodes in Singapore to be too expensive in combination with AWS limitations that prevented us from deploying AWS nodes in Asia. This was solely our decision, and this limitation has been removed since.

  Currently we prefer AWS over linode since we need over 14GB of RAM and over 20GB of disk. To run a single instance on linode, we need to pay 160$ a month. On AWS we are more flexible with respect to disk and RAM, i.e. cheaper. Furthermore dedicated hosts are prefered over virtual ones. Ideally, we would like to have Hetzner performance and price (roughly 60$ for a dedicated host that allows deployment of two nodes) in Asia, but unfortunately, we haven't found such a service yet.
- IP addresses of backend nodes are not published to prevent denial of service attacks