



BioBrain Security and Networking Overview

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About the BioBrain

The BioBrain is a new technology innovation developed by BioHitech America. The BioBrain is computing technology embedded into every Eco-Safe Digester, allowing the Digester to be a network-capable device. Customers benefit by tracking and managing waste utilization using BioHitech Cloud's web-based dashboards and reports. BioHitech service personnel receive alerts and diagnostic data, improving support turn-around time and customer service levels.

Customers need only provide a network connection to the Internet. Optionally, BioHitech can provide a 3G/4G wireless data connection for an additional cost.

The BioBrain is a feature shipped with all new Eco-Digesters. Existing Digesters can be easily retrofitted. Contact your BioHitech America sales representative for details.

Computing and Network Security

The BioBrain itself is a locked down computing device, running a secure version of the Linux operating system. The computer runs a minimal set of network services, minimizing



any vector for security attacks. The devices do not accept inbound network connections, and any super-user logins are disabled. Our systems engineering staff routinely runs network scans and vulnerability scans against our hardware and software to ensure a high level of integrity.

All data sent by the BioBrain is securely transmitted directly to BioHitech using industry standard SSL (Secure Socket Layers) and TLS (Transport Layer Security) technology. The BioBrain performs strict validation on all SSL/TLS certificates. Leveraging SSL/TLS for all data transmission eliminates eavesdropping and spoofing by a malicious third-party.

The BioBrain device limits outbound network access exclusively to port 443 (for all SSL/TLS traffic), and only to a limited number of IP addresses, allowing for enterprise firewall administrators to easily limit the BioBrain's access on a corporate network. Please contact BioHitech for more specific information on network security parameters.

Finally, our engineering team has extensive experience building secure, Internet enabled technology deployed inside of retail environments. The engineering team has built secure computing solutions for some of the world's largest and most demanding customers, including: GE Money, HSBC, Wells Fargo, MBNA, Citi-Financial, and Comcast to name a few.

Network Activity and Bandwidth

The BioBrain tracks over a hundred pieces of information about the Digester and transmits the data back to BioHitech America regularly for real time data analysis. However, this doesn't mean that the BioBrain is a large consumer of network resources.



Average utilization of a BioBrain is around 2mb of network activity per day. With 2mb of data, BioHitech is still able to get telemetry data on over 100 pieces of data, every thirty seconds. Sometimes, even sooner if there is an important event (system malfunction or the door is opened on the digester).

BioHitech uses a variety of methods to optimize the data payloads. While data is collected every thirty seconds, the BioBrain does not send the data immediately (unless there is an important reason to do so). This allows data to be batched, reducing network overhead. All data payloads are compressed using gzip DEFLATE. Combined with the data payload batching, the data becomes highly compressible. Finally, configuration telemetry data is typically not sent with every transmission, unless something has changed. Employing these methods achieves over a 90% bandwidth savings.

Our engineering staff routinely measures and audits our network activity of the BioBrain to ensure that new software releases or upgrades do not introduce unwanted network activity.

Conclusion

The BioBrain is new technology introduced by BioHitech that provides customers with real-time waste analytics data and support personnel with real-time support telemetry.

The solution was designed to be as secure as possible on a customer network and respectfully minimize the bandwidth footprint of the solution.