

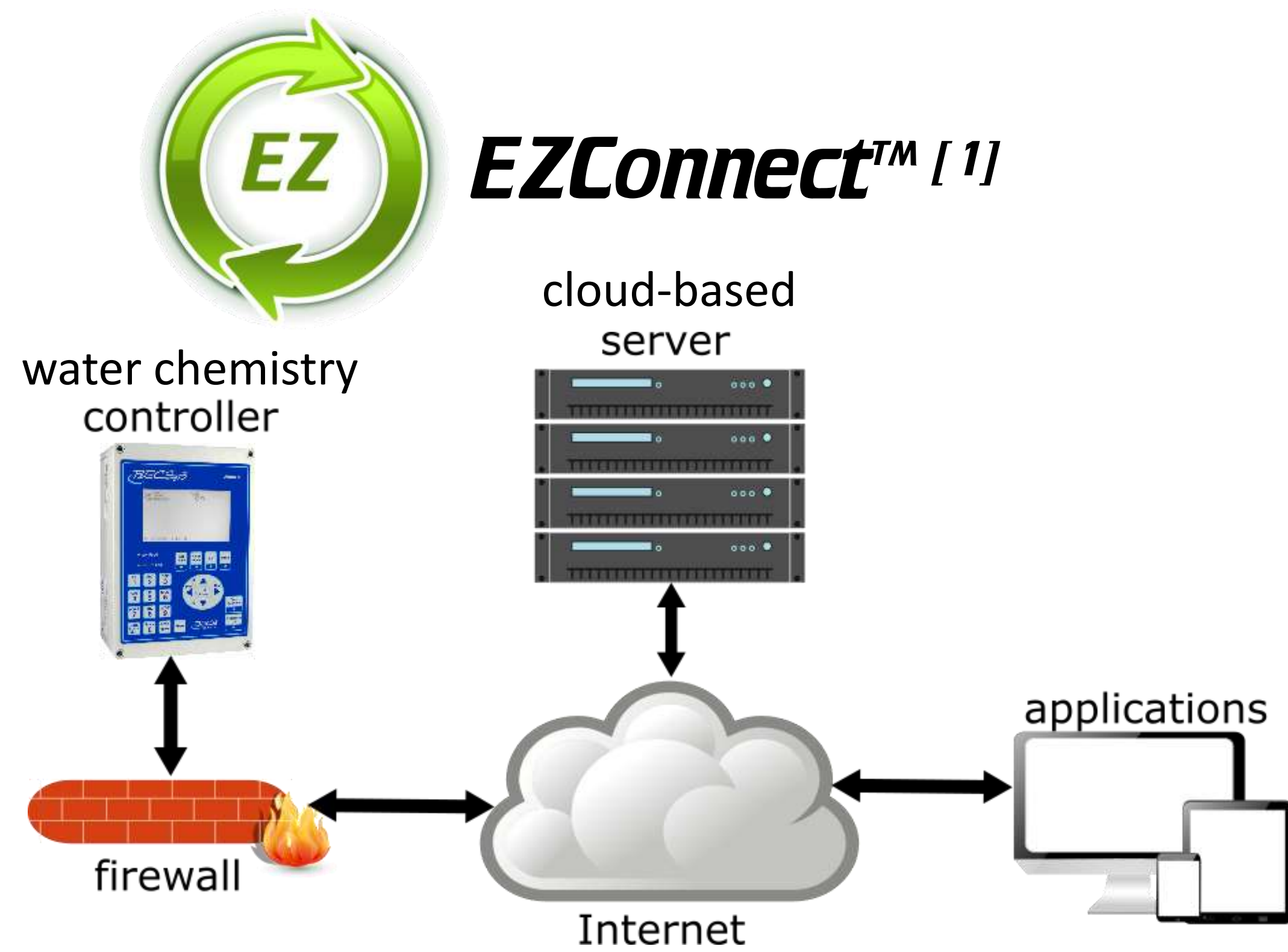


Water in the Cloud: Remote Understanding of Water Chemistry



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Collect sensor readings (pH, ORP, free Cl, temperature), alarms, and events from controllers. Log in database.

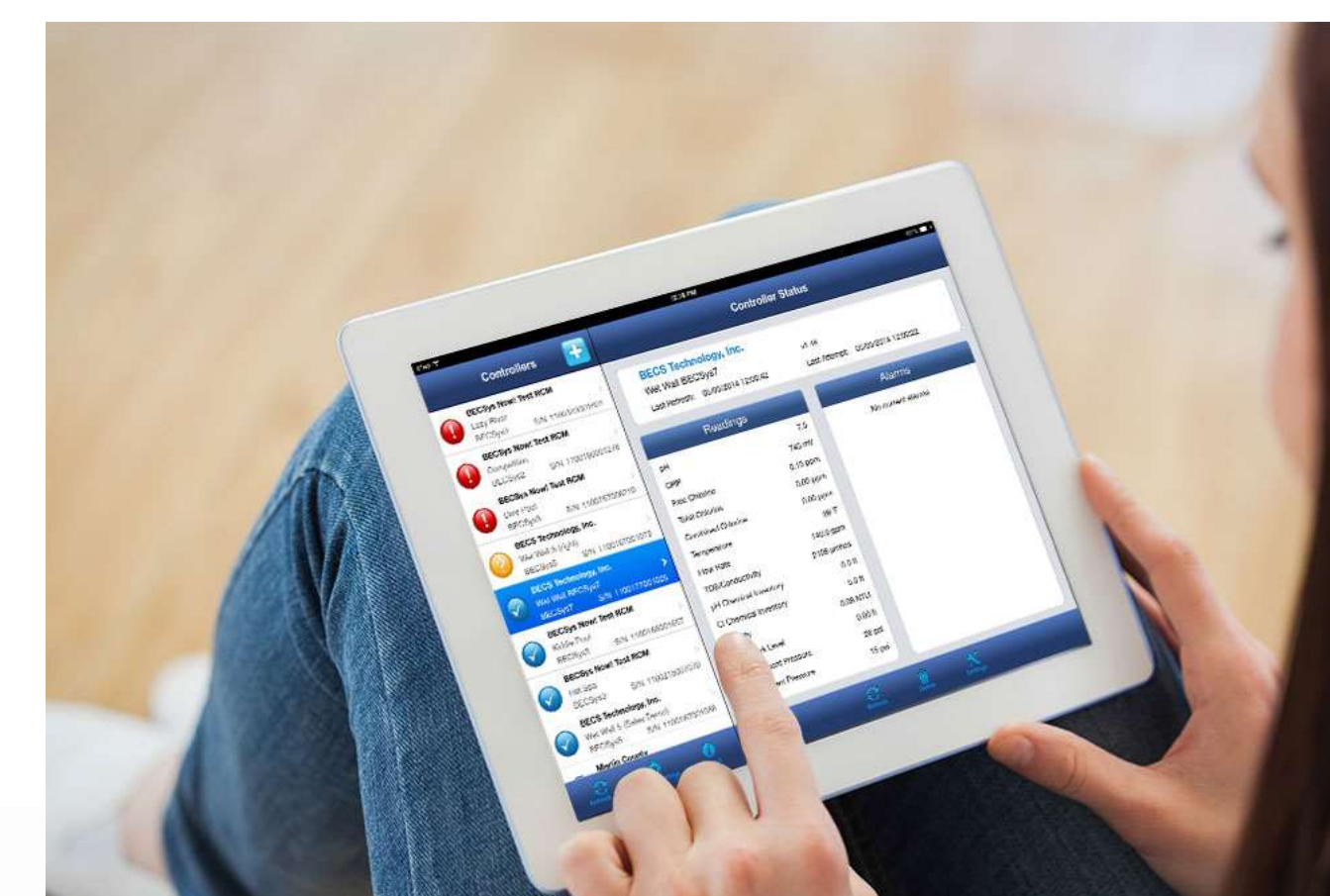
We are investigating machine learning techniques to:

- Learn the effectiveness of control decisions
- Recommend better control approaches
- Minimize chemical usage
- Predict problems before they occur

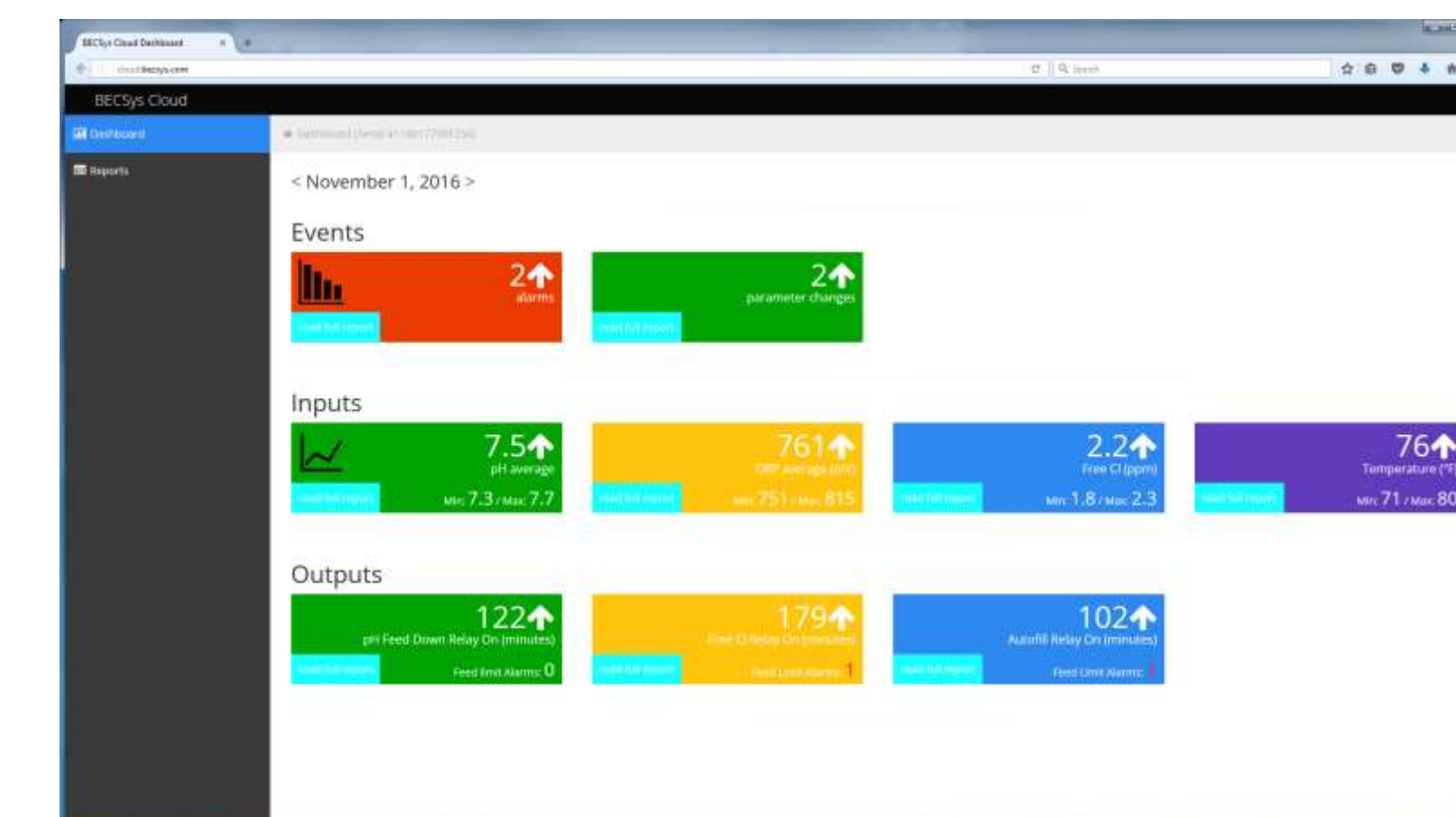
- Secure communication, through firewalls
 - Uses TLS encryption on all links
 - Semantically limited protocols (cannot query other devices on local network)
- Hassle-free installation
 - Equipment managers are happy
 - IT personnel are happy (no VPN setup or port forwarding required)
- Straightforward to service
 - Temporary access is simple to provide for service personnel
- Near universal adoption in marketplace



Investigate triggers for anomalous conditions



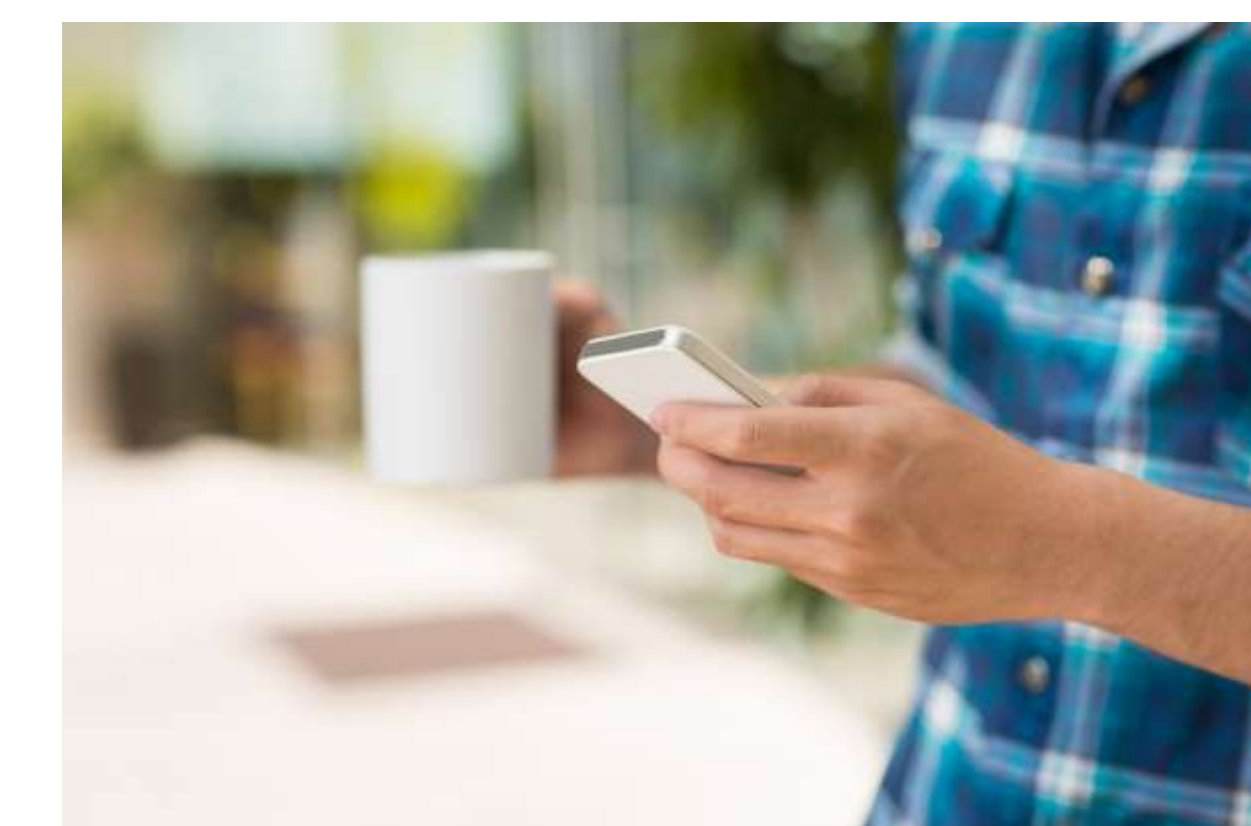
Where ever you are, using any connected device



Provide summary view of water chemistry, with drill down capability



Alarm conditions trigger notification via email or text



[1] R. Chamberlain et al., "Layered Security and Ease of Installation for Devices on the Internet of Things," in *Proc. IoTDI*, 2016.