FTR Market - IT Operations

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Markets & Finance Applications

- IT Infrastructure

- FTR Market Infrastructure

- FTR Market Software

- Network Infrastructure
  - Routers, switches, DNS, firewalls, etc.

- Security Infrastructure
  - Monitoring, detection and prevention measures
  - Malware, ransomware, denial of service controls

- Storage
  - Completed major storage upgrades in early 2021

- Continuous patching at all levels (firmware, operating system, application)

- Continuous hardware and software upgrade cycles

- **FTR Market Clearing Servers**

  – Dedicated physical hardware

  – Responsible for vast majority of FTR market processing

  – 3-4 year hardware upgrade cycle - Hardware upgrade scheduled for 2022

- **FTR Database Servers**

  – Shared physical hardware

  – Continuous database performance monitoring and tuning

  – Upgraded to latest database software version in spring 2021

  – 5-7 year hardware upgrade cycle - Hardware upgrade scheduled for 2023

- Frequent business continuity exercises

- **FTR Market Clearing Engines**
  - Functions: problem formulation, market clearing, etc.
  - Responsible for vast majority of FTR processing

- **FTR Center**
  - Functions: portfolio management, bid submission, reports, APIs, etc.

- **30 production software releases YTD as of August 2021**