

# DDF3 Knight Capital Post-Mortem, SOLUTIONS

## Q1. Three control failures, one per layer.

**Solution.** (a) **Deployment:** no canary or staged rollout, all 8 servers went live at 09:30 ET, turning an 8-server partial failure into an unbounded blast radius. (b) **Pre-trade risk:** no notional or rate limit at the FIX gateway, so Power Peg submitted 4 million child orders in 45 minutes (1,480/sec) without tripping a threshold. (c) **Kill switch:** the operations team needed human judgment to find the bad algorithm and tried 4 fixes (including re-running the broken deploy on the other 7 servers, which made it worse); no unilateral “flatten all and halt” button with trader authority existed.

## Q2. Five-point deployment checklist (catch in < 4.5s).

**Solution.** (1) **Canary:** deploy to 1 server (under 5% traffic) for 15 min at open with a \$100k notional cap; abort on P&L trip. (2) **Bit-inventory scan:** CI flags reuse of any FIX flag bit ever used for a different semantic in the last 10 years (a one-line regex would have caught “Power Peg”). (3) **Pre-trade circuit breaker:** auto-halt an algo ID if realised P&L < -\$500k in any 60-second rolling window (fires at second 5 here). (4) **Symbol-universe guard:** reject orders to any symbol not in a 24-hour curated allowlist. (5) **One-click trader kill:** “halt all, cancel open, flatten at VWAP over 30 min”, authorised by any of 3 on-call traders, no engineering escalation. Controls (3)+(5) stop Knight within 4.5 seconds, capping loss below \$1M.

## Q3. Would a \$5M loss have been survivable?

**Solution. Yes.** Knight’s 2011 net income was about \$115M and regulatory capital about \$365M, so a \$5M loss is roughly 1.4% of capital, a normal trading-day drawdown. Survival depends on the circuit firing fast enough to stay within normal loss tolerance (1 to 3% of capital) rather than catastrophic (100%+). The point is latency: a 45-minute circuit is useless, a 5-second circuit is insurance. Regulatory follow-up: SEC Rule 15c3-5 now mandates pre-trade credit and capital checks for US broker-dealers, and MiFID II Article 17 imposes similar duties, codifying the Knight checklist as law.