

## Warpstor Super Chown Program Statement of Work with Hours Estimates

Phase 1 – Projected delivery date: November 14, 2019

1. Standalone **super-chown** program – 168 hours<sup>†</sup>
  - High Level Design – 24 hrs
  - Initial coding phase
    - Thread pool management including initialization and shutdown/reaping – 10 hrs
    - Multi-threaded directory recursing algorithm – 34 hrs
    - thread marshalling scheme – 16 hrs
  - Detailed research of NFS and ZFS tuning/configuration options for bottleneck mitigation – 8 hrs
  - Testing, debugging, and tweaking multi-threaded directory recursion operation – 32 hrs
  - Secondary coding phase
    - ZFS and NFS configuration – 8 hrs
    - Fine grained coding of initial code phase sections – 24 hrs
    - debugging scheme implementation (initial debug output converted into a universal scheme for debug mode operation) – 4 hrs
    - minimal metrics collection and reporting – 4 hrs
  - testing and evaluation - 4hrs

Estimate: \$16,800

Phase 2 – Ship date TBD

1. Convert to standing daemon – 20 hours<sup>†</sup>
  - Add daemon mode, deprecate standalone mode
    - keep standalone debug mode
    - design/implement communication scheme for invocation: shared queue or networking
  - testing and evaluation
2. Full fledged metrics including real-time progress and SNMP reporting – 80 hrs
  - time-based progress metrics (eg.: files/dirs processed, files/s etc.)
  - low-overhead reporting method – seemingly continuous updates
  - SNMP code (optional)
  - testing and evaluation

<sup>†</sup> All estimates are  $\pm 25\%$  accuracy, as exact amount of work cannot be completely envisioned until actual engineering of the tasks ensues.