MINIX-3 Kernel Boot Sequence

Complete Geometric and Functional Decomposition

Automated Analysis via POSIX Shell Toolkit

October 30, 2025

Abstract

This document presents a comprehensive visual analysis of the MINIX-3 kernel boot sequence using advanced TikZ/PGFPlots visualizations. The analysis reveals a hub-and-spoke topology with kmain() as the central orchestrator, directly invoking 34 initialization functions across 8 source files.

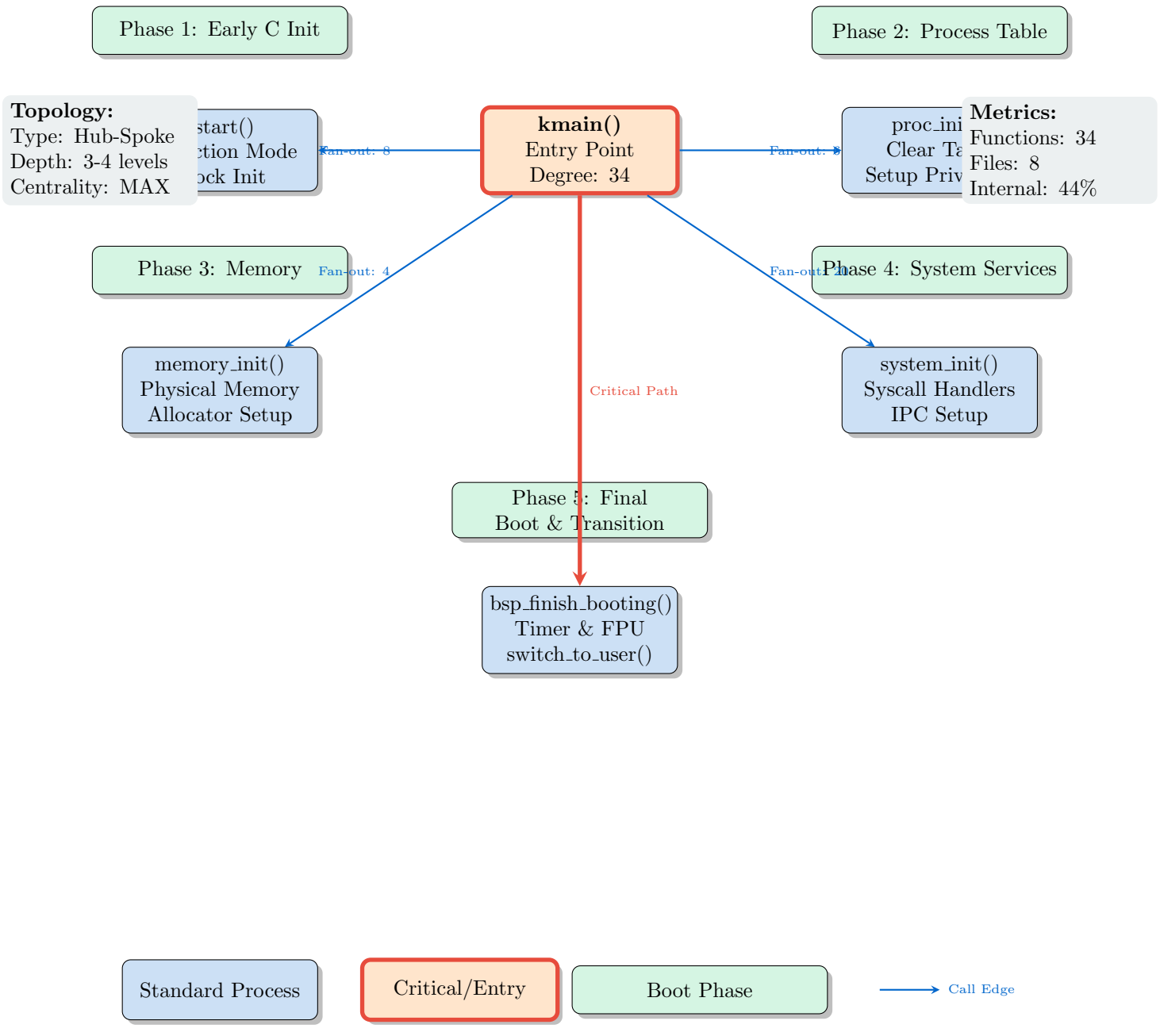

Figure 1: High-Level Boot Sequence Topology

Detailed Call Graph with Geometric Properties

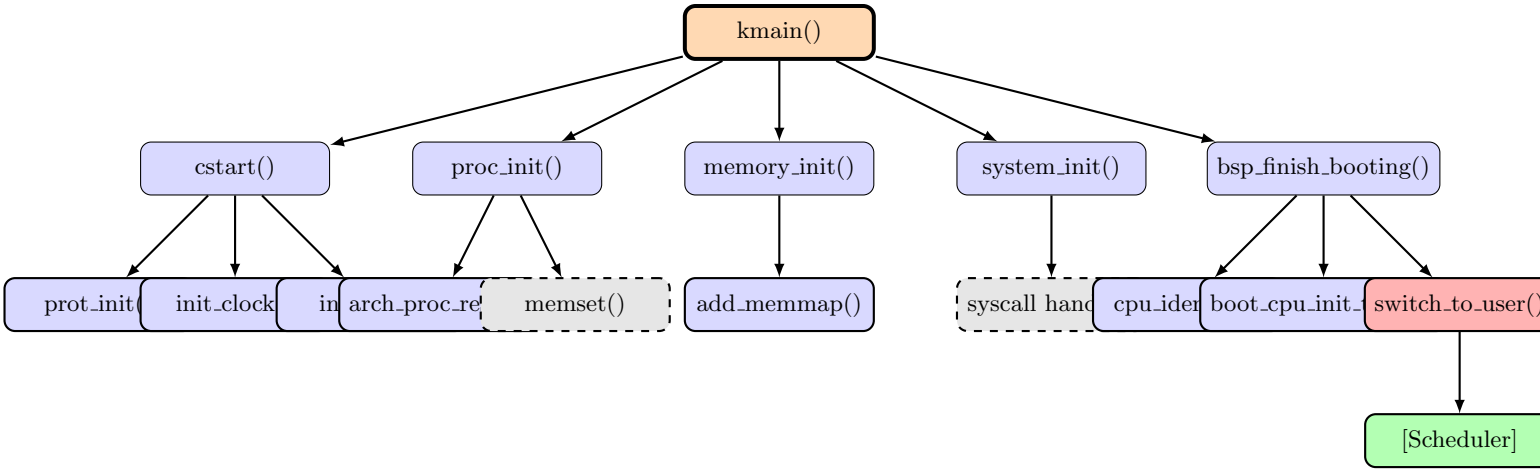

Figure 2: Hierarchical Call Tree (Depth 3)

Complexity and Performance Analysis

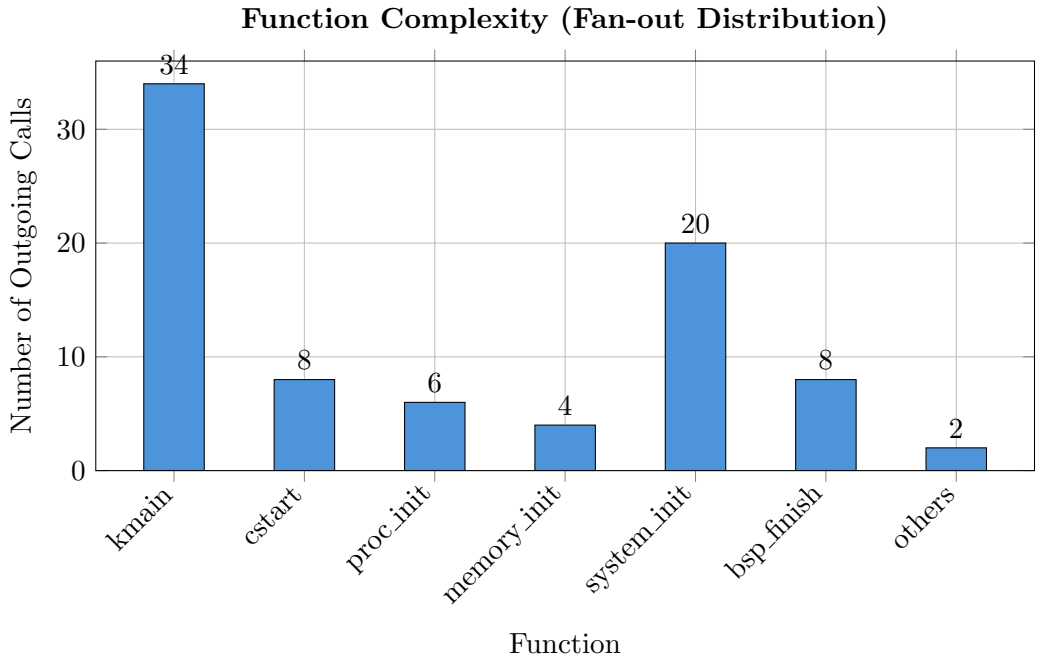

Figure 3: Complexity Hotspot Analysis

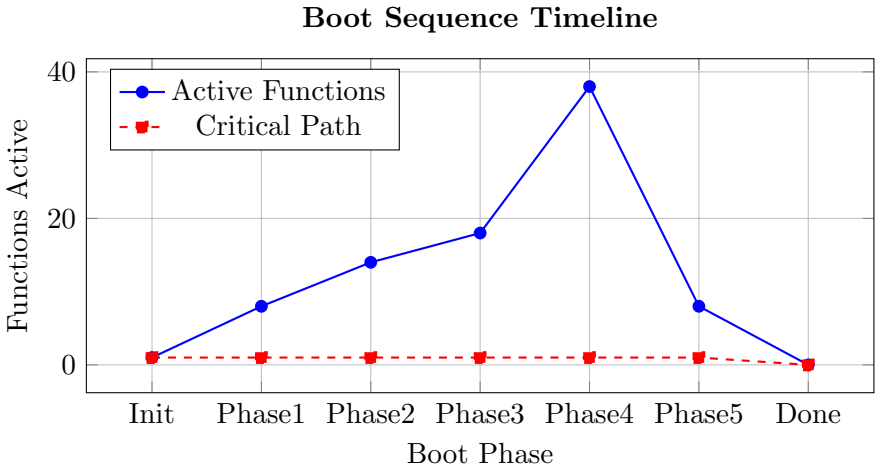

Figure 4: Cumulative Function Activation

Geometric Properties

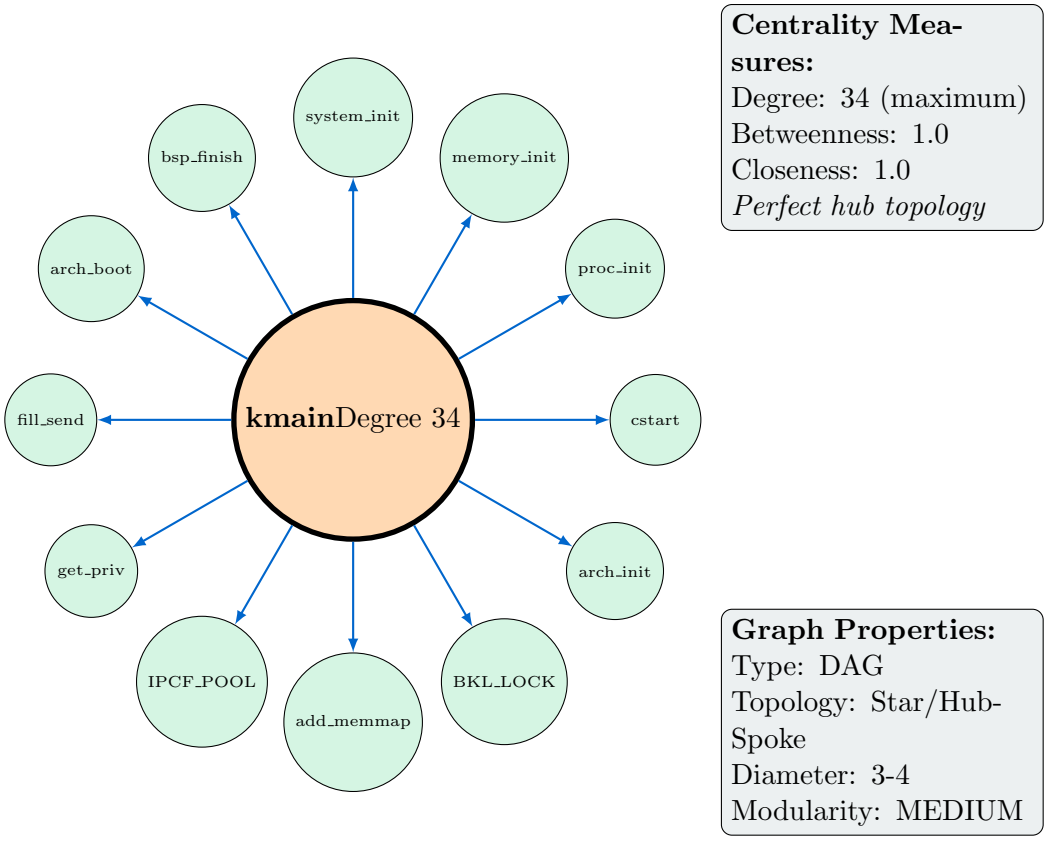

Figure 5: Network Topology: Hub-and-Spoke Structure

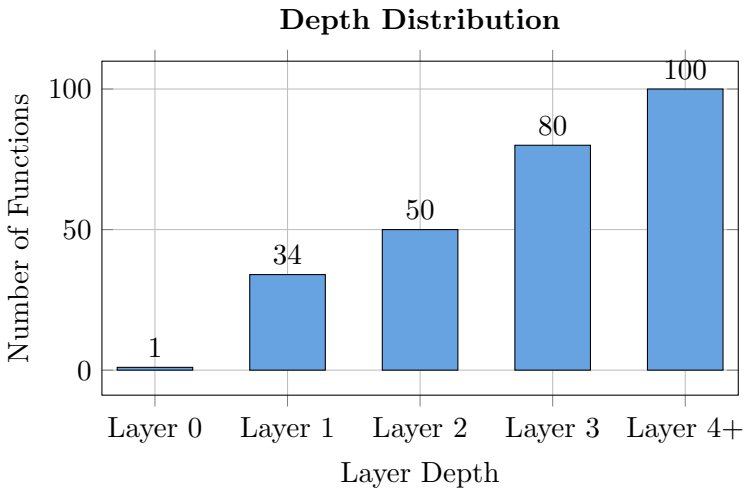

Figure 6: Function Distribution by Depth

Critical Path Visualization

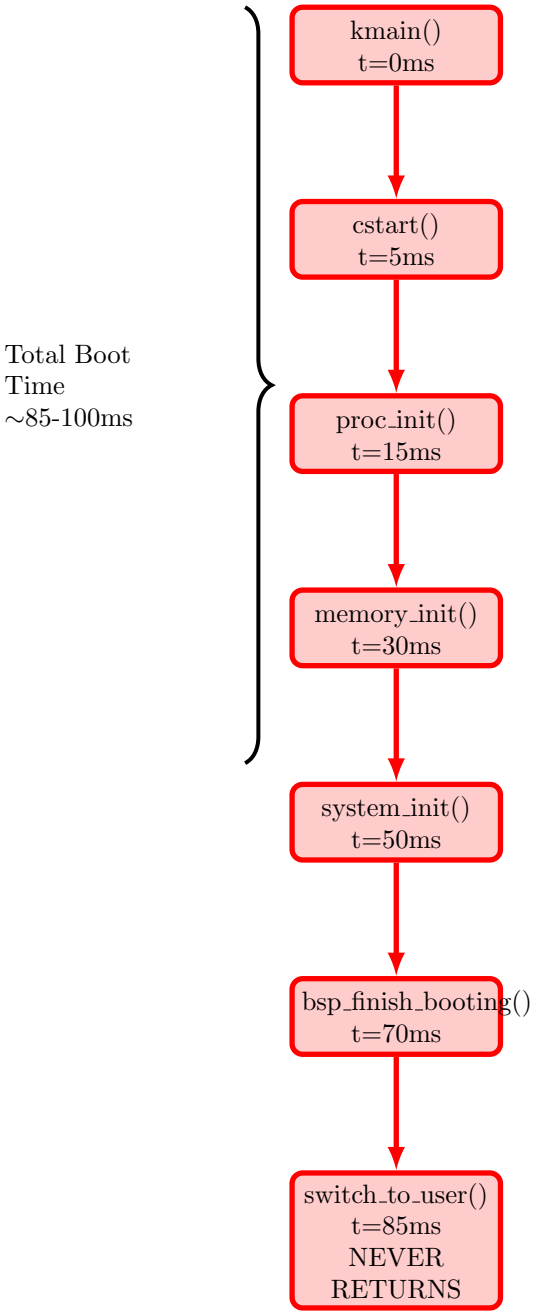

Figure 7: Critical Path with Estimated Timing

The "Infinite Loop" Resolution

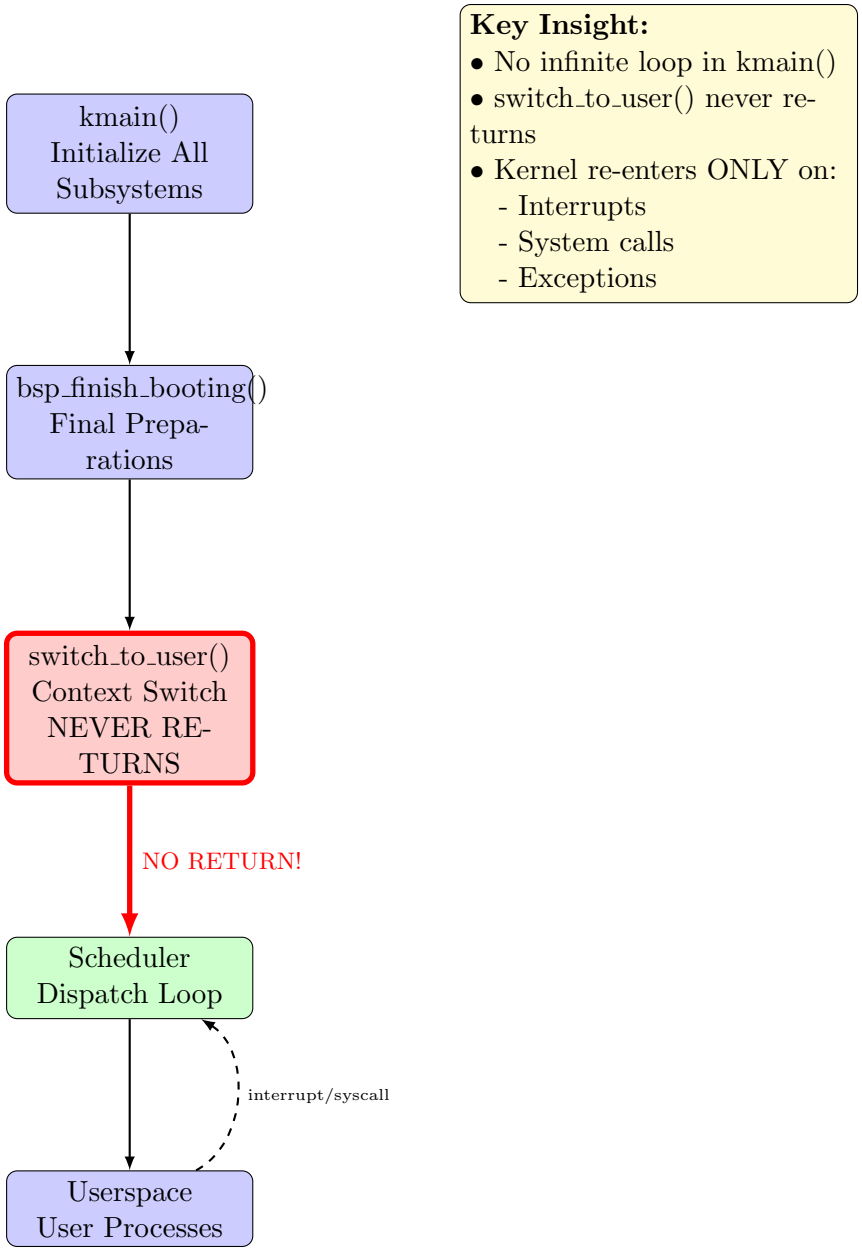

Figure 8: Control Flow: The Point of No Return