

NVIDIA OMNIVERSE INTEGRATION PLAN

For BOS Factory Simulation, Digital Twin, and Executive Delivery

1) Objective

Deploy NVIDIA Omniverse as the visual simulation layer for BOS to model plant flow, robotic/human station interaction, throughput scenarios, and executive-ready simulation outputs.

2) Intended Outcomes

- Digital twin of each manufacturing plant
- Station-level simulation for robotic + human workflows
- Throughput and bottleneck scenario testing
- Export-ready visual assets for banker/government/C-suite presentations

3) Required Hardware Stack (Workstation Baseline)

Minimum Recommended

- CPU: 8+ core modern processor
- RAM: 64 GB
- GPU: NVIDIA RTX 4080/4090 class (or RTX A-series equivalent)
- VRAM: 16 GB minimum (24 GB preferred for heavier scenes)
- Storage: 2 TB NVMe SSD (separate project drive recommended)
- OS: Windows 11 Pro (or validated Linux build)

Team/Studio Recommended

- CPU: 16+ cores
- RAM: 128 GB
- GPU: RTX 4090 / RTX 6000 Ada (or equivalent)
- Network storage for shared USD assets and versioned scene files

4) Required Software Stack

Core

- NVIDIA Omniverse Launcher / current Omniverse platform installer
- Omniverse USD Composer (or equivalent Omniverse app for scene creation)
- Omniverse Nucleus (shared asset repository, local or server)

Supporting

- NVIDIA Studio Driver (latest stable production driver)
- Python 3.10+ (automation scripts)
- FFmpeg (render post-processing and distribution formatting)
- Optional: Git LFS for versioned large assets

5) Deployment Architecture (Fast Start)

Layer A — Authoring

- One lead workstation for scene authoring and simulation setup

Layer B — Shared Assets

- Nucleus project namespace for plant, equipment, people/robot proxies, textures, and layouts

Layer C — Rendering & Delivery

- Render outputs to review folder
- Post-process with FFmpeg for presentation-ready video

6) Asset Package Structure (for Workstation Team)

Create this folder structure before build:

```
/omniverse-bos/  
  /00-governance/  
    naming-convention.md  
    review-workflow.md  
  /10-layouts/  
    plant-footprints/  
    line-a-line-b-zones/
```

/20-equipment/
robotic-cells/
hvac-plumbing-electrical/
/30-people-and-roles/
human-stations/
supervision-safety/
/40-sim-config/
throughput-scenarios/
shift-calendars/
kpi-overlays/
/50-renders/
previews/
executive-cuts/

7) Station Package Checklist (Per Plant)

For each station (1–14):

- Station name and function
- Input/output dependencies
- Cycle-time assumption
- Quality gate rules
- Safety constraints
- Responsible role
- KPI tags (throughput, defects, handoff, downtime)

8) 30-Day Integration Rollout

Week 1

- Install Omniverse stack
- Validate GPU/driver compatibility
- Stand up Nucleus and folder schema

Week 2

- Ingest plant layout and station packages
- Build first digital twin baseline scene

Week 3

- Configure simulation scenarios (Phase 1/2/Scale)
- Add KPI overlays and exception markers

Week 4

- Produce executive outputs: 60s preview + 3–5 min review cut
- Publish governance SOP for ongoing updates

9) Step-by-Step Install Checklist (Omniverse Workstation)

1. Confirm hardware meets target profile
2. Update to latest NVIDIA Studio Driver
3. Install Omniverse platform tools (Launcher/installed apps)
4. Install USD Composer (or equivalent Omniverse authoring app)
5. Configure local or shared Nucleus workspace
6. Create project folder schema and naming standards
7. Run sample scene benchmark test (FPS + memory + stability)
8. Import first plant footprint and station placeholders
9. Validate render/export pipeline to MP4 via FFmpeg
10. Document baseline config for repeat workstation deployment

10) Governance and Controls

- Version all scene files and assumptions
- Separate draft vs approved render outputs
- Weekly simulation review cadence tied to BOS KPI deltas
- Keep one approval owner for published executive visuals

11) Delivery Package for Russ (What Team Should Hand Back)

- Omniverse environment readiness report
- Baseline digital twin scene package
- 14-station simulation configuration sheet
- 60-second executive preview render
- 3–5 minute review render
- Update SOP for monthly revisions

Executive Summary

Omniverse can become the BOS simulation backbone for plant-scale digital twins, KPI-linked operations visualization, and investor/government-grade presentation outputs. The key success factor is disciplined deployment: hardware readiness, standardized asset packaging, and controlled publish workflow.