Product Development Lifecycle

Introduction

The Product Development Lifecycle (PDL) at Quantum Dynamics defines our structured approach to conceptualizing, designing, building, testing, and releasing product features. This document outlines the key phases, deliverables, and responsibilities throughout the lifecycle to ensure consistent, high-quality product development.

Lifecycle Overview

Our product development follows six distinct phases:

1. **Discovery**: Identify market opportunities and validate user needs
2. **Definition**: Scope features and create detailed requirements
3. **Design**: Create technical and user experience designs
4. **Development**: Build and implement the functionality
5. **Testing**: Validate quality and performance
6. **Release**: Deploy to production and monitor adoption

Phase 1: Discovery

Goal: Identify valuable product opportunities aligned with business strategy and user needs.

Activities

- Market research and competitive analysis
- User interviews and feedback analysis
- Problem statement development
- Opportunity sizing and prioritization
- Initial feasibility assessment

Key Deliverables

- Opportunity brief
- User research findings
- Market analysis report
- Business case with estimated ROI
- Go/No-go decision for concept

Roles & Responsibilities

- **Product Manager**: Lead opportunity identification, create business case
- **UX Researcher**: Conduct user research, analyze feedback
- **Data Analyst**: Provide market data and metrics
- **Engineering Lead**: Assess technical feasibility

Exit Criteria

- Business case approval by Product Leadership
- User need validation with minimum 10 customer interviews
- Technical feasibility confirmed by Engineering
- Prioritization score above threshold in product roadmap

Phase 2: Definition

Goal: Transform validated opportunities into clearly defined requirements and specifications.

Activities

- User story mapping
- Requirements gathering and documentation
- Acceptance criteria development
- Technical requirements specification
- Resource estimation and planning

Key Deliverables

- Product requirements document (PRD)
- User stories in Jira
- Acceptance criteria
- Technical specification document
- Preliminary release plan

Roles & Responsibilities

- **Product Manager**: Create PRD, define user stories and acceptance criteria
- **Engineering Lead**: Develop technical specifications
- **UX Designer**: Contribute user experience requirements
- **QA Lead**: Review acceptance criteria

Exit Criteria

- PRD approved by Product and Engineering leadership
- All user stories created and prioritized in Jira
- Technical approach validated through architecture review
- Resource allocation confirmed

Phase 3: Design

Goal: Create detailed user experience and technical designs that meet requirements.

Activities

- Wireframing and prototyping
- User interface design
- Technical architecture design
- User testing of prototypes
- Design reviews

Key Deliverables

- Wireframes and UI mockups
- Interactive prototypes
- Technical design documents
- Database schema changes
- API specifications
- User testing results

Roles & Responsibilities

- **UX Designer**: Create wireframes, mockups, and prototypes
- **UI Designer**: Develop visual designs
- **Engineering Lead**: Develop technical architecture
- **Product Manager**: Review designs against requirements
- **Accessibility Specialist**: Ensure designs meet accessibility standards

Exit Criteria

- Design review completed with stakeholder approval
- Prototype tested with minimum of 5 users
- Technical design reviewed and approved
- Designs meet brand and accessibility guidelines

Phase 4: Development

Goal: Build the product features according to approved designs and specifications.

Activities

- Sprint planning
- Code development
- Code reviews
- Internal testing
- Documentation creation
- Daily stand-ups and progress tracking

Key Deliverables

- Working code in development environment
- Unit tests
- Technical documentation
- Code review records
- Sprint demos

Roles & Responsibilities

- **Engineers**: Develop code, perform unit testing, conduct code reviews
- **Engineering Manager**: Track progress, remove blockers
- **Product Manager**: Clarify requirements, review progress
- **Technical Writer**: Create documentation

Exit Criteria

- All user stories implemented
- Code review completed
- Unit test coverage meets minimum threshold (80%)
- Sprint demo completed with stakeholder feedback
- No critical bugs in development environment

Phase 5: Testing

Goal: Ensure the product meets quality standards and fulfills acceptance criteria.

Activities

- QA test planning
- Functional testing
- Integration testing
- Performance testing
- Security testing
- User acceptance testing (UAT)
- Bug fixing

Key Deliverables

- Test plans and cases
- QA test results
- Performance benchmark results
- Security assessment report
- UAT signoff
- Bug reports and resolution documentation

Roles & Responsibilities

- **QA Engineers**: Create test plans, execute tests, report bugs
- **Engineers**: Fix identified bugs
- **Product Manager**: Coordinate UAT, prioritize bug fixes
- **Security Team**: Conduct security assessment
- **Performance Engineer**: Execute performance tests

Exit Criteria

- All test cases executed
- No severity 1 or 2 bugs open
- Performance meets defined benchmarks
- Security assessment passed
- UAT completed with stakeholder approval

Phase 6: Release

Goal: Deploy the feature to production and monitor adoption and performance.

Activities

- Release planning
- Documentation finalization
- Training internal teams
- Staged deployment (if applicable)
- Feature flag management
- Post-deployment monitoring
- User feedback collection

Key Deliverables

- Release notes
- Updated user documentation
- Training materials
- Deployment plan
- Monitoring dashboard
- Post-release report

Roles & Responsibilities

- **Release Manager**: Coordinate deployment activities
- **DevOps Engineer**: Execute deployment
- **Product Manager**: Communicate release, collect feedback
- **Customer Support**: Prepare for user questions
- **Marketing**: Coordinate external communications

Exit Criteria

- Successful deployment to production
- Monitoring shows stable performance
- Initial user feedback collected
- No critical issues reported
- Post-release retrospective completed

Agile Implementation

The Product Development Lifecycle operates within our agile framework:

- Discovery and Definition phases typically span 2-4 weeks
- Design, Development, and Testing occur within 2-week sprints
- Features may require multiple sprints to complete all phases
- Daily stand-ups, sprint planning, and retrospectives occur throughout

Governance and Decision Points

Stage Gates

A formal review occurs at the end of each phase:

1. **Concept Approval**: After Discovery phase
2. **Requirements Approval**: After Definition phase
3. **Design Approval**: After Design phase
4. **Development Complete**: After Development phase
5. **Quality Approval**: After Testing phase
6. **Release Authorization**: Before Release phase

Decision Authority Matrix

Decision Type	Authority
New feature approval	Product Council
Scope changes > 20%	Product VP + Engineering VP
Technical approach	Engineering Leadership
UX design direction	Design Leadership
Quality signoff	QA Director
Release go-live	Release Review Board

Metrics and Success Criteria

Process Metrics

- Cycle time from concept to release
- Development velocity (story points per sprint)
- Defect density (bugs per feature)

- Test coverage percentage
- First-time quality rate

Product Success Metrics

Each feature should define specific success metrics, such as:

- User adoption rate
- Task completion rate
- Performance improvements
- Revenue impact
- Support ticket reduction

Tools and Resources

- **Product Management**: Aha! (roadmapping), Confluence (documentation)
- **Design**: Figma (UX/UI design), Miro (user flows)
- **Development**: Jira (stories/tasks), GitHub (code repository)
- **Testing**: TestRail (test management), JMeter (performance testing)
- **Release**: Jenkins (CI/CD), PagerDuty (monitoring)

Templates and References

Find the following templates in the Product Team shared drive:

- Product Requirements Document template
- Technical Specification template
- User Research Plan template
- Feature Kickoff Meeting agenda
- Release Checklist