

PTS2 intro

Strategy analysis, Business analysis, SDLC

SW examples

- **AutoNav** (Autonomous Navigation) - NASA's spacecraft and rovers navigation software
- Ferko Mrkvička - TIA project: Floorball Club Penguins Bratislava Management Web Page
- **ESET NOD32 Antivirus**
- **George** - internetbanking of Erste Group
- **Electronic toll system** (Slovakia)
- **Instagram**
- **Ubuntu linux**

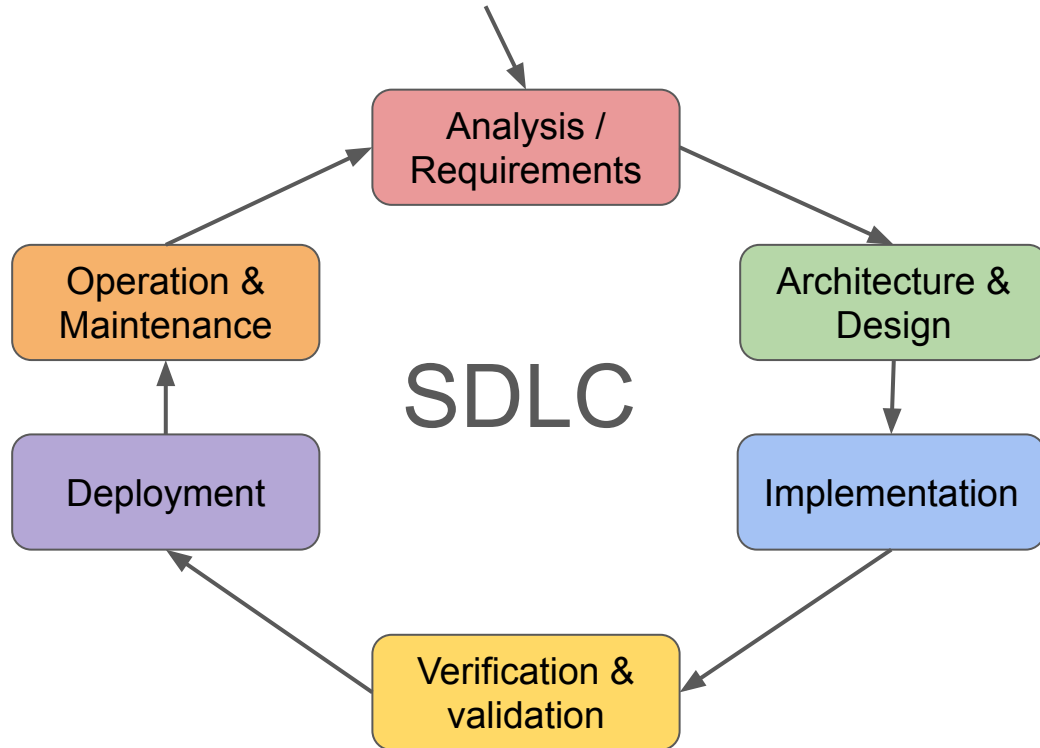
Triggers behind SW development

- Business
 - Built for profit
- Scientific
 - Built for knowledge / national prestige
- Societal (open source)
 - Built for community benefit and broad public use
- Educational (student projects)
 - Built to gain personal knowledge and experience
- Hobby
 - Built for personal interest
- Humanitarian
 - Built to improve well-being
- ...
- Hybrid models

Business / commercial SW development

- Increase revenue vs decrease costs
- Traditional vs innovative
- Standardization vs customization
 - COTS - Commercial Off-The-Shelf
 - MOTS - Modified Off-The-Shelf
 - Custom-build
- In-house vs outsourced

Software development lifecycle (SDLC)



SDLC - systems development life cycle

= A set of activities necessary to develop a software

- Each phase builds on the results of all previous phases
- Phases does not need to run sequentially, they may be combined or overlap
- Phases vs. roles

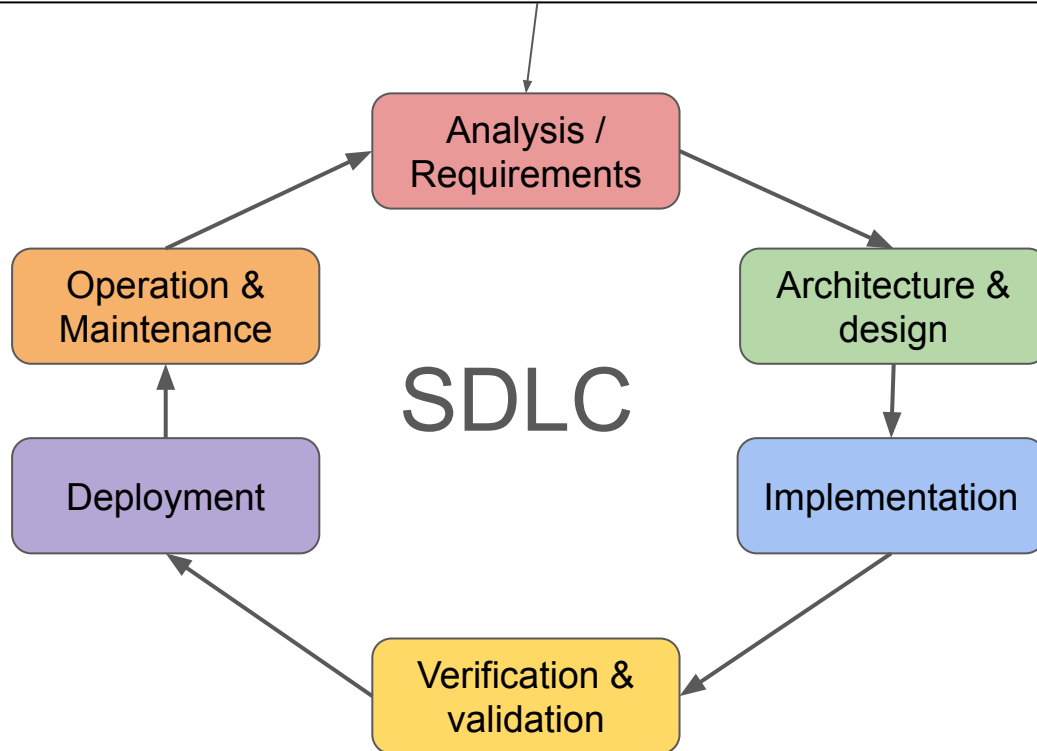
Running example: OutdoorShop

OutdoorShop

- A retail company selling **outdoor clothes & equipment**
- **Five** brick-and-mortar shops in five different cities in Slovakia
 - BA, TT, NR, PP, KE
- Headquarters in Bratislava



We want to develop and launch an **e-commerce platform** that meets **these business requirements (...)**



Business strategy

“Strategy is the direction and scope of an organisation over the long term, which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations.”

Johnson, Scholes and Whittington (2008)

Business strategy

Strategy goals

- Long-term, SMART
- WHAT we want to achieve
- Inputs from strategy analysts

Strategy definition

- Long-term plan HOW to achieve strategic goals
- Inputs from strategy analysts

SMART goal

S - Specific

- It clearly states what we want to achieve

M - Measurable

- It has a quantifiable metric to track progress

A - Achievable

- It is realistic given resources / capabilities

R - Relevant

- It aligns with the vision/ultimate goal

T - Time-bound

- It has a clear deadline or timeframe

- CEO / Board of Directors / Top management
- Strategy analysts (internal employees or external consultants) deliver data needed for decisions

A strategy game

SID MEIER'S
CIVILIZATION VI

Analogy: Think about popular strategy games

Strategy goals (Science Victory)

1. Build the **Apollo Program** within **50 turns**.
2. Research **Robotics** and **Space Flight** by a (**certain era**).
3. Maintain a science output **200 science points per turn**.

Strategy definition

- Choose civilization with higher potential for science victory (e.g., Korea or Babylon)
- Focus on building campuses and libraries early
- Prioritize research agreements and trade routes
- Avoid heavy military engagement unless necessary
- Build and expand cities near strategic resources to support production and science output

OutdoorShop

Strategy goals

1. Increase annual net profit **by 50%** over the next **5 years**.
2. Launch an **e-commerce platform** within **2 years** and generate **15%** of total company revenue through online sales within **the first year** of operation.
3. Achieve **20%** revenue growth per year within 2 years.

Business strategy

- Develop a fully functional, user-friendly e-commerce platform integrated with operations, supported by trained staff and marketing campaigns to generate online revenue.
- Open new physical stores in new regions
- Introduce new products
- Optimize pricing strategies
-

Ultimate strategy goals

- **Finance view** → profit maximization, wealth of owners, value of the company
- **Strategic management view** → survival, growth, competitiveness
- **Modern view** → stakeholder value, sustainability, CSR (Corporate Social Responsibility)

Mostly a combination, e.g., profit + market share

The exact choice is based on leadership ambitions, company legacy, industry trends, stakeholders expectations, cultural / economic context,...

For example:

- USA - shareholder-oriented market,
- Japan - traditionally focus on product / service quality and long-term relationships

Examples: <https://asana.com/resources/strategic-goals-objectives>

Strategy analysis

- Internal and external
 - SWOT analysis
 - Used to determine external and internal factors that help/hinder the achievement of goals
1. Strengths: internal, positive
 - Experienced staff
 - Strong brand recognition
 2. Weaknesses: internal, negative
 - Limited online presence
 - Limited marketing budget
 3. Opportunities: external, positive
 - Growing online shopping trend
 - Increasing interest in outdoor activities
 4. Threats: external, negative
 - Increasing tax burden
 - Decreasing purchasing power of the population



Using SWOT

For strategy goals

Opportunity: Growth of online shopping →

Goal: “Launch an **e-commerce platform** within **2 years** and generate **15%** of total company revenue through online sales within **the first year** of operation”

For business strategy definition

Threat: Rising tax burden →

Strategy: “Optimize operations and cost structure to maintain profitability under higher tax pressures”

OutdoorShop - e-commerce platform

“Develop a fully functional, user-friendly e-commerce platform integrated with operations, supported by trained staff and marketing campaigns to generate online revenue.”

The strategy is further refined into **business requirements** and **actions** (tactics).

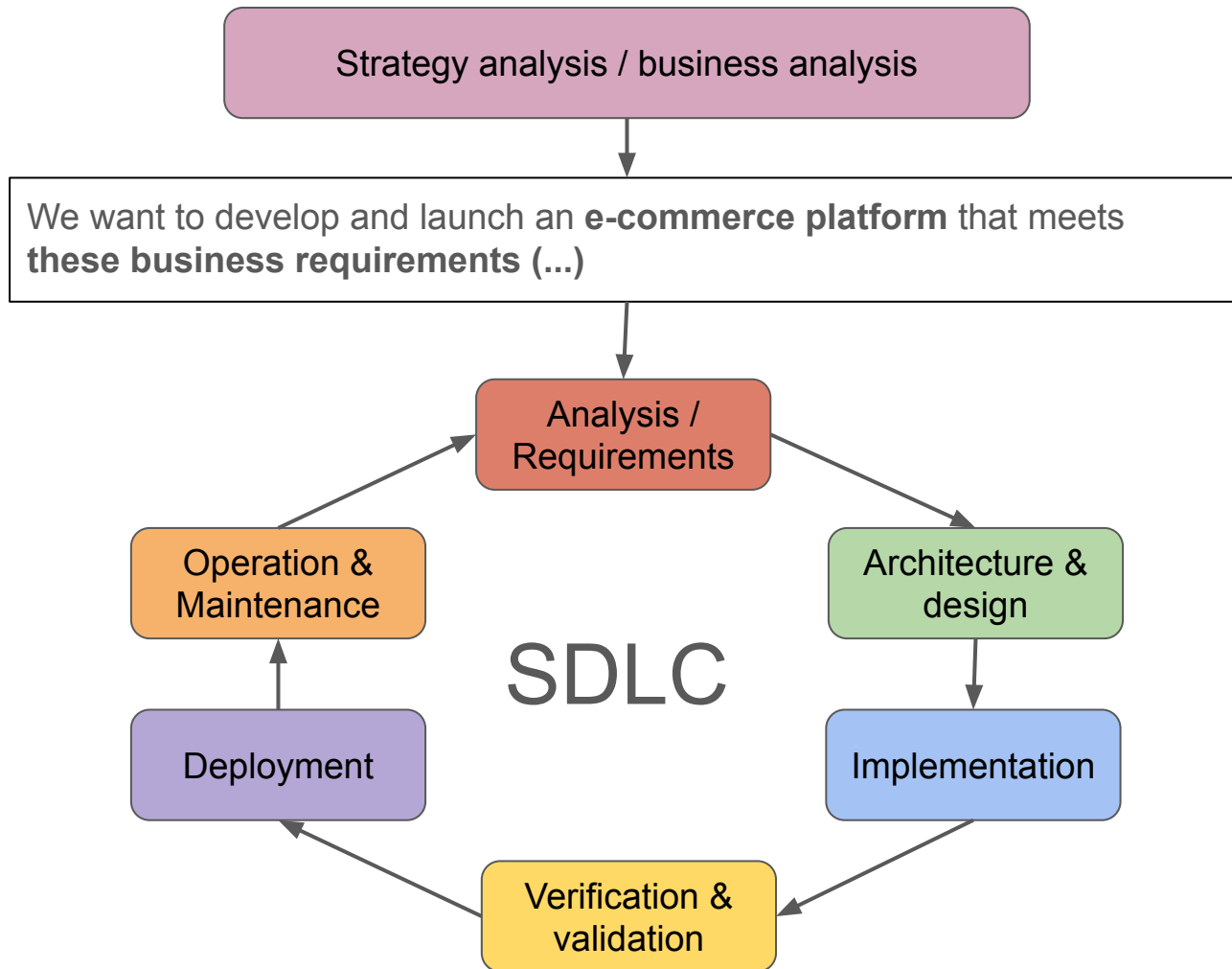
Business requirements (output of **business analysis**)

- Customers must be able to browse, select, and purchase products easily, ensuring satisfaction and repeat visits
- The platform should attract new customers and generate at least 15% of total revenue online in the first year
-

Actions

- Develop and launch platform
- Implement dashboard to track key indicators (conversion rate, average order value)
- Define new job roles and hire employees
- Define and implement new operational processes
- Launch marketing campaigns
- ...

Projects are initiated, a project delivers one or more actions



- Software systems are typically developed within a broader business context
- SDLC must be synchronized with related initiatives - usually handled by project / program management.

Analysis / Requirements

WHAT the (new / changed) system should do

= Discovering, documenting, and maintaining a set of requirements for an IT system

Input

- Initial documentation of given IT project (business requirements, business case ,...)

Output

- Requirements specification
 - Text / models / diagrams / schemas / ...

This phase is also known as “Requirements analysis”, “Requirements engineering”, “IT business analysis” or “System analysis”

Requirements

Architecture &
design

Implementation

Verification &
validation

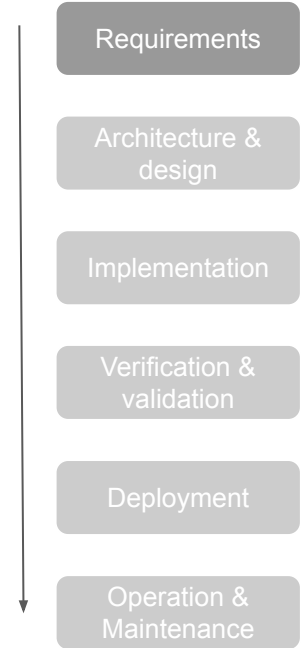
Deployment

Operation &
Maintenance

Requirements - example

Project “E-commerce store” - example requirements:

- User shall be able to put one or more items into their shopping basket.
- User shall see price for each item.
- User shall be able to pay for items in shopping basket by credit or debit card.
- System shall be able to handle 10K sessions simultaneously.
-



HOW the (new / changed) system should work

Architecture provides a high-level arrangement of components or modules.
Design provides a detail arrangement within an individual component or module.

Input

- Initial documents of an IT project
- Requirements specification

Output

- Architecture models & documentation
- Design models & documentation

Requirements

Architecture &
design

Implementation

Verification &
validation

Deployment

Operation &
Maintenance

Project “E-commerce store”

- System shall use client-server architecture
- System shall be implemented using MVC (model-view-controller) pattern
- System shall use the following logical data model - E-R diagram attached
- ...

Requirements

Architecture &
design

Implementation

Verification &
validation

Deployment

Operation &
Maintenance

- Implementation → Write the code
- Verification & validation → Test the system
- Deployment → Make the system available to users in production
- Operations & Maintenance → Support the system & fix bugs and implement updates

} Not that simple,
see PTS1



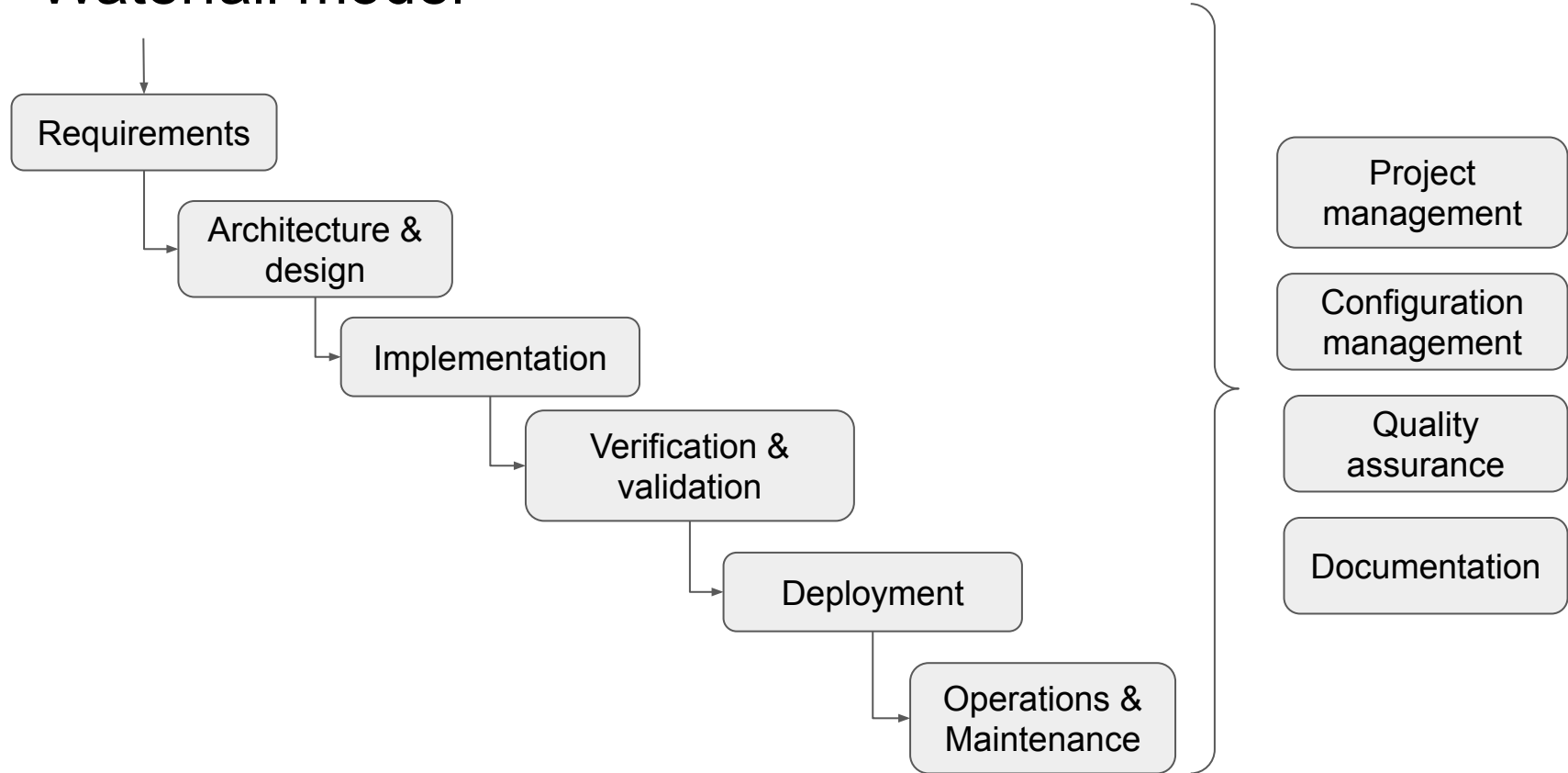
Supporting activities

- Project management
 - Planning (project plan, milestones, deadlines, resource allocation), risk management, project dependencies, facilitation, status reporting...
- Configuration management
 - Its purpose is to establish and maintain the integrity of all of the identified outputs of a project or process and make them available to concerned parties
- Quality assurance
 - Ensures that quality requirements will be fulfilled throughout the process
- Documentation
- ...

Models / methodologies / approaches

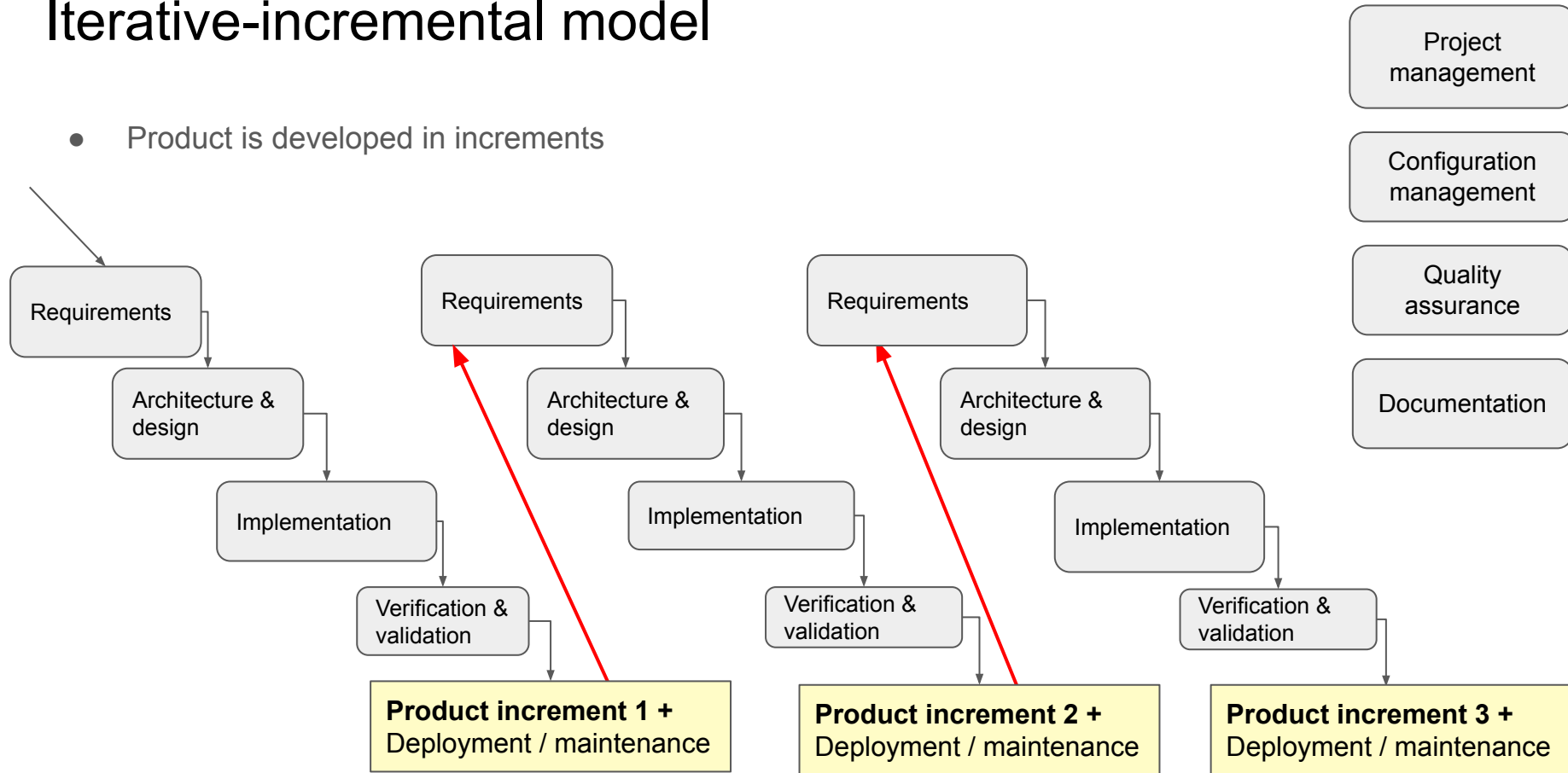
- Waterfall
- Iterative and incremental development
- Spiral development
- Rapid application development
- Extreme programming
- Agile
- Continuous integration
- Lean management
- ...

Waterfall model



Iterative-incremental model

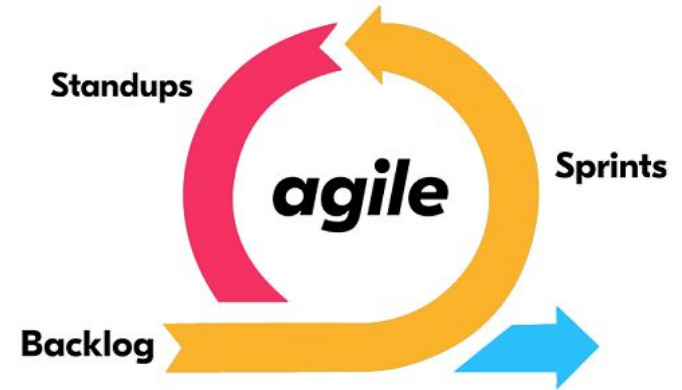
- Product is developed in increments



Agile methodologies

- Flexibility
- Collaboration
- Quality
- Continuous improvement

- Based on iterative-incremental model
- Solutions evolve through collaboration between self-organizing, cross-functional teams.
- ! Also agile approaches have their limitations.



Software development process - PTS1 vs PTS2

Phases

1. *Strategy & business analysis*
2. Requirements
3. Design and architecture
4. Implementation
5. Verification and validation
6. Deployment
7. Operations & Maintenance

Supporting activities

- Project management
- Configuration management
- Quality assurance
- Documentation

PTS1: yellow

PTS2: emphasis on
topics not in PTS1

References & further reading

- OpenStax: [Principles of Management](#)
- A Guide to the Business Analysis Body of Knowledge (BABOK® Guide)
- Wikipedia: [SWOT analysis](#)
- Ian Sommerville: Software Engineering 10th Edition
- [Software Engineering Body of Knowledge \(SWEBOK\)](#)
- Robert Lukot'ka: [Software development process, Software contracts](#)