Bridging the gap from rapid prototyping to market ready product

Viewpoint to embedded HW product development

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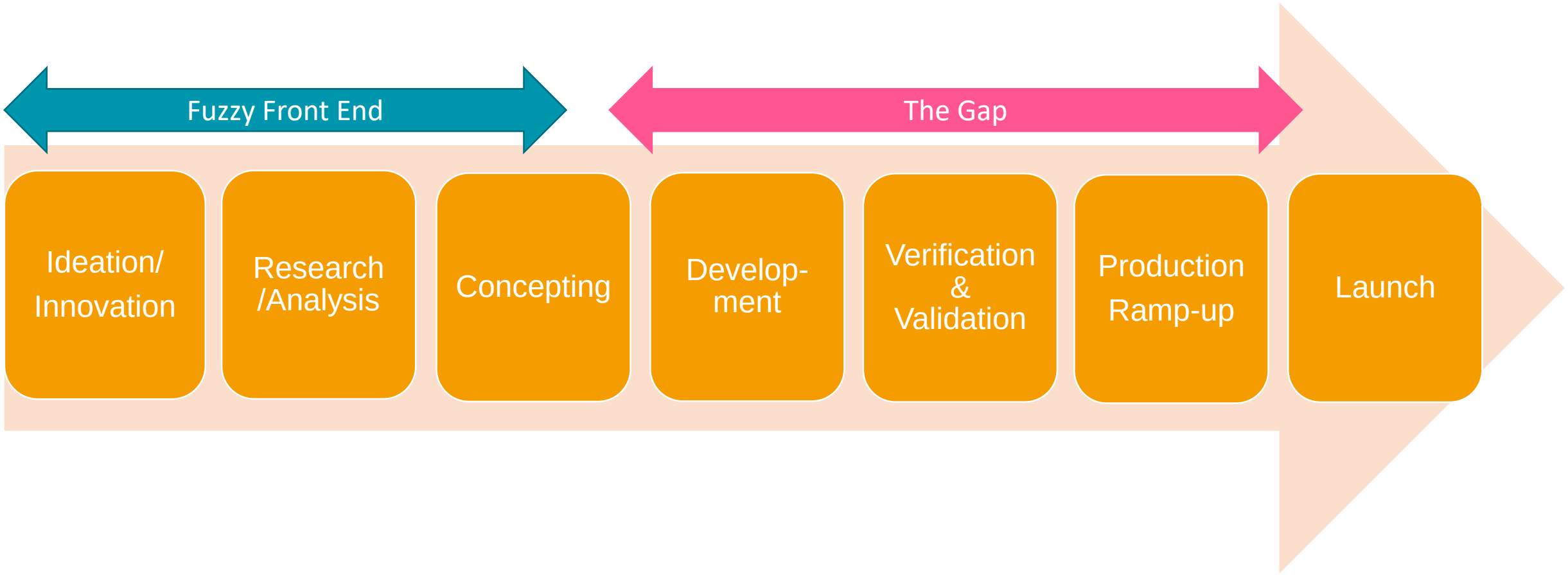
Story from the trenches

- SME customer, specialized in software, no own HW experience
- VC funded; constraints on time and money
- Has a working prototype as proof-of-concept, implemented with a maker-community processor board + breadboard circuit
- Very aggressive timeline to bring product to market, was supposed to be ready ”yesterday”
- IoT-product with multiple radios, needs radio type approvals
- Is aimed to EU but also North-American market at launch
- Is looking for help to bring the product from current state to market readiness

Simplified HW product development process



What is “The Gap” ?

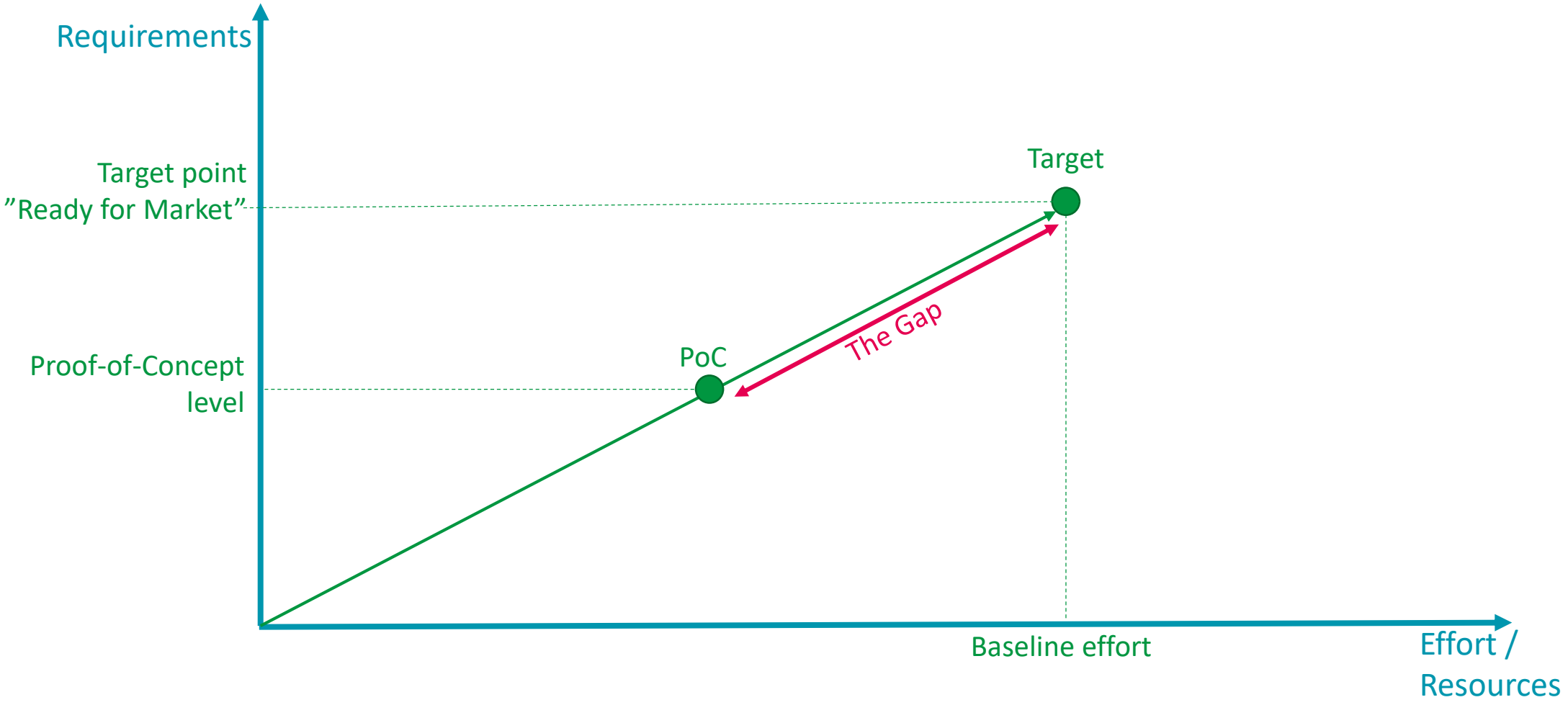
- With the gap we mean the difference in requirements and effort between having a proof-of-concept level prototype and having a product ready for market.

- Rapid prototyping is a key enabler in the fuzzy front end of innovation and is helping to reduce the gap

- But requirements for market entry are increasing and getting more complex which is widening the gap

- Overall the gap is not going away – but we have a method to help bridging it efficiently!

The gap visualized

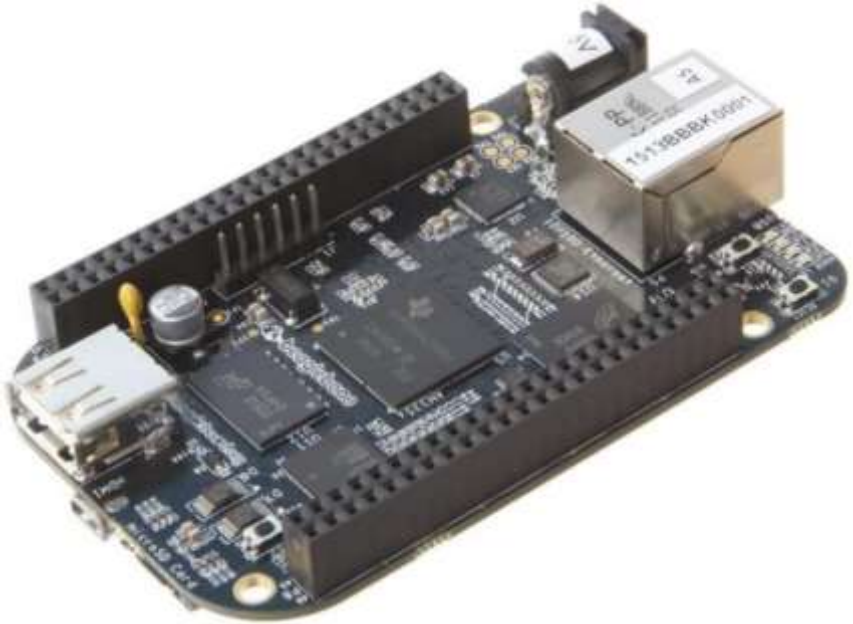


Impact of rapid prototyping

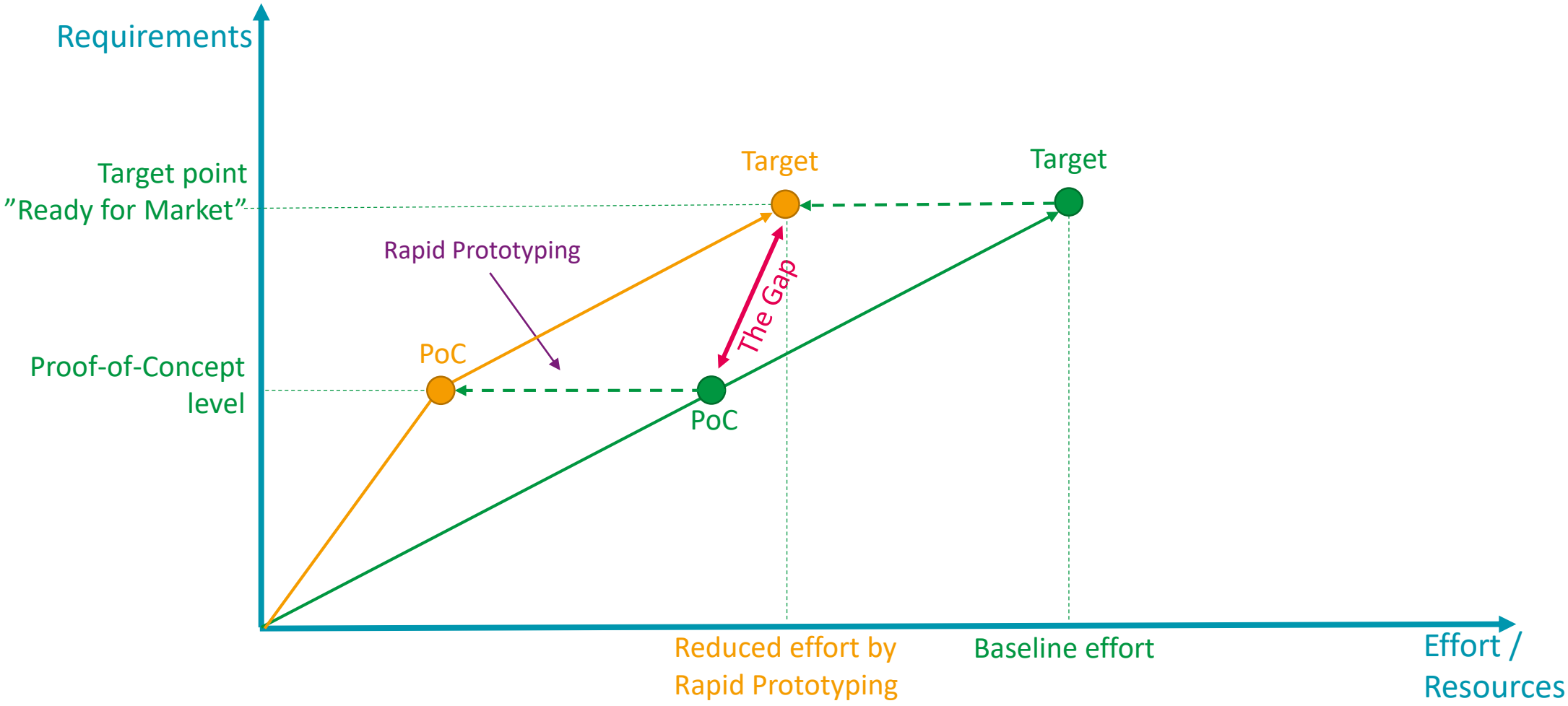
- Easier and faster than ever to reach functional prototype or Proof-Of-Concept level
- Narrows the gap

- Boards and modules, community and maker stuff
- SW frameworks , ARM mbed etc
- Simulation, modelling, X in loop
- Additive manufacturing, 3D printing

- Almost the real thing!



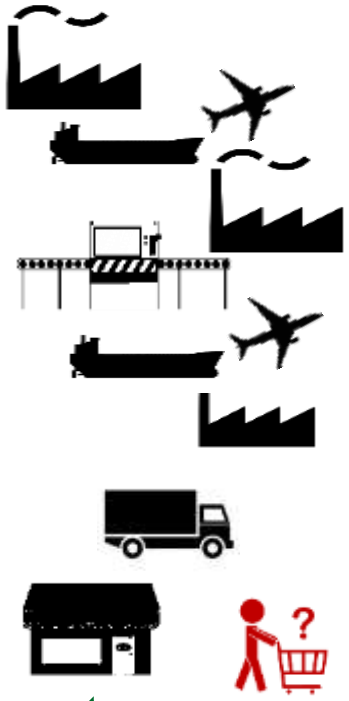
Rapid prototyping is reducing the gap



What is market readiness?

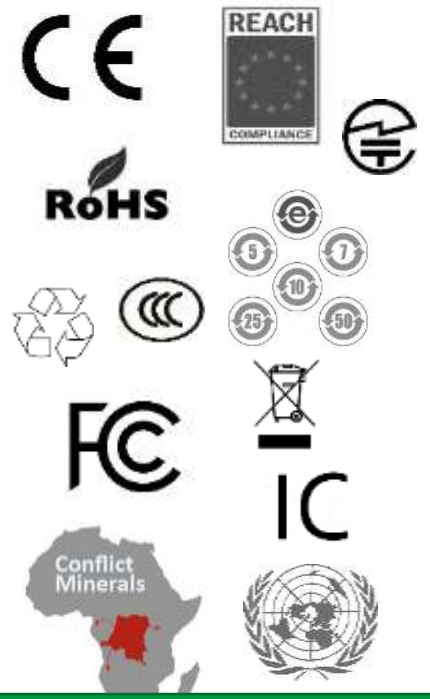
Working Supply Chain

- Costs & regulation rising
- Protectionism & tariffs



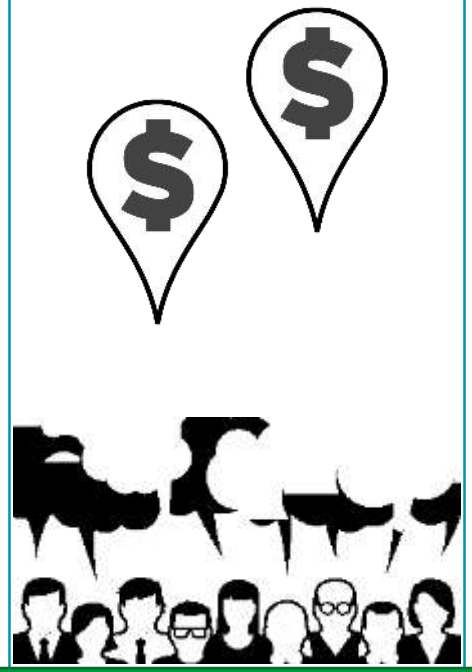
Regulatory Compliance

- Increasing steadily
- Tighter Standards



Cost Structure & Customer needs

- Fulfills end customer needs
- Allows viable pricepoint



Security

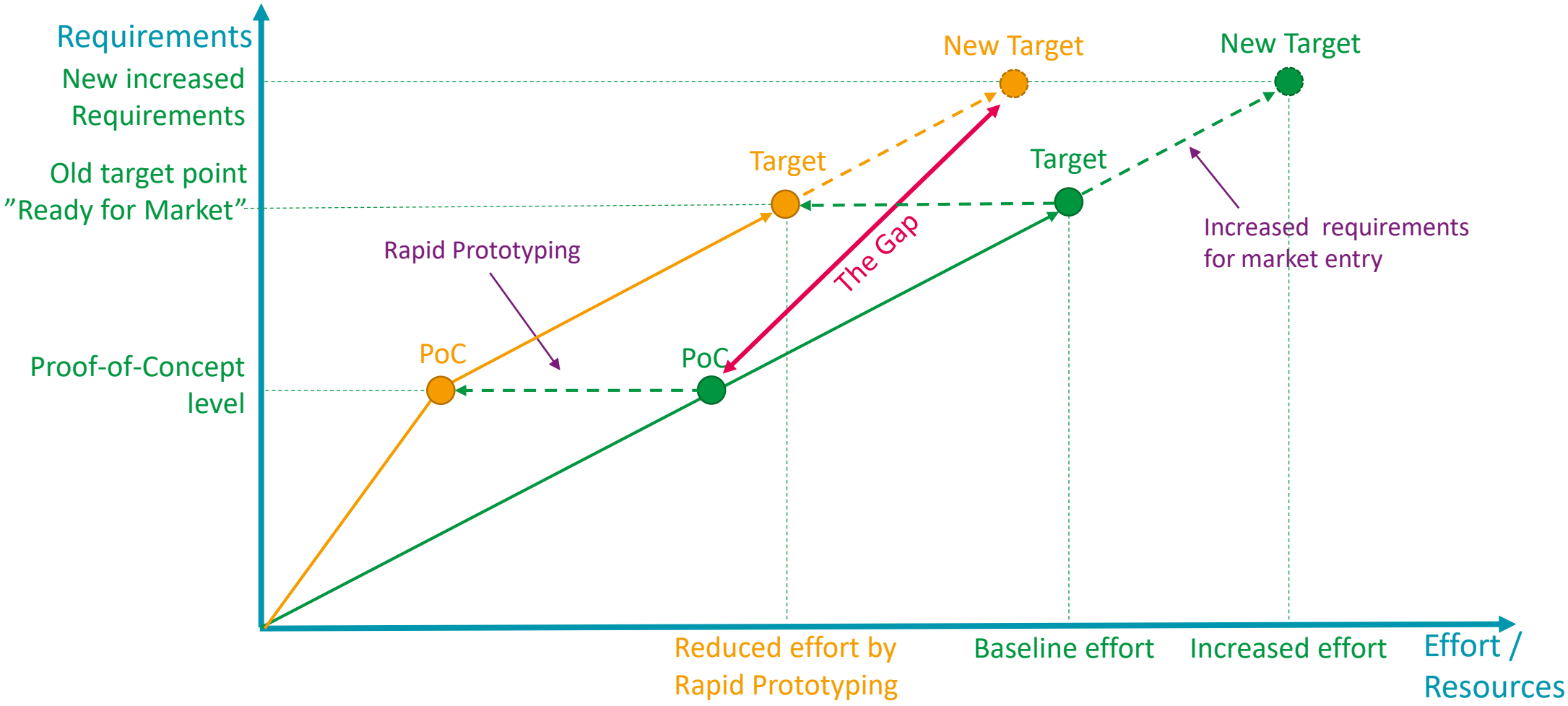
- New threats constantly emerging
- Requirements and implementation complexity increasing

IPR's

- Creation and protecting
- Licensing
- Avoiding violations

MARKET READY

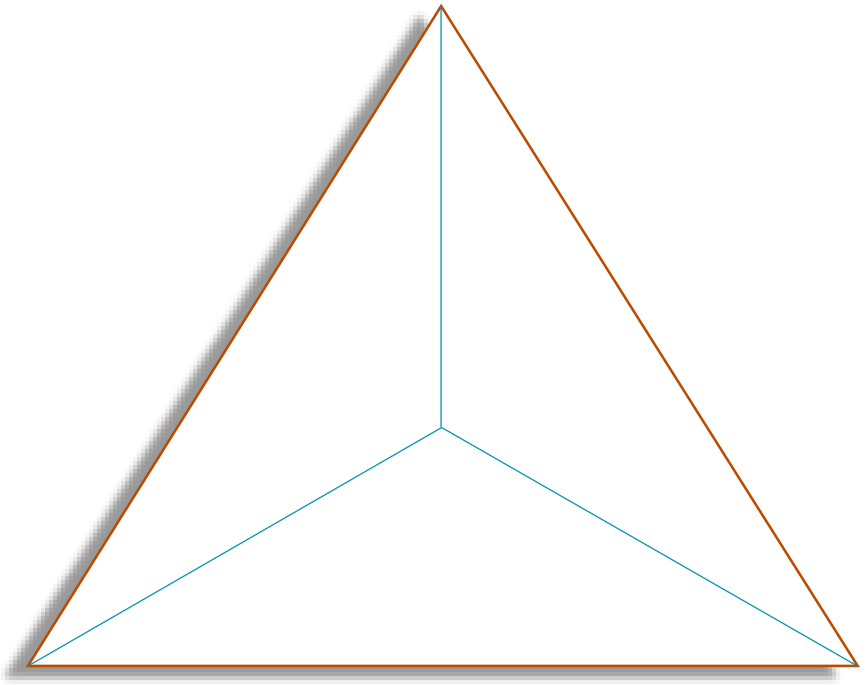
While additional requirements are increasing it



Normal constraints apply

X

- As much as possible



Time

- As little as possible

Money

- As little as possible

Where **X** can be e.g.

- Functionality
- Quality
- Regulatory compliance
- Meeting user requirements
- …

Bridging the gap

Bridging the gap presents many tasks and challenges of which we address today the following three:

- Development effort
- Reaching compliance
- Supply chain set up

Development effort

Some of the needed activities:

- Design and implementation of production models of electronics, SW and mechanics (utilizing DFX principles)
- Verification on unit, integration and system levels
- Setting up prototype manufacturing and testing facilities, sourcing
- Precompliance testing to verify EMC, safety and environmental compliance before certification
- Documentation
- Production tooling design, manufacturing and verification

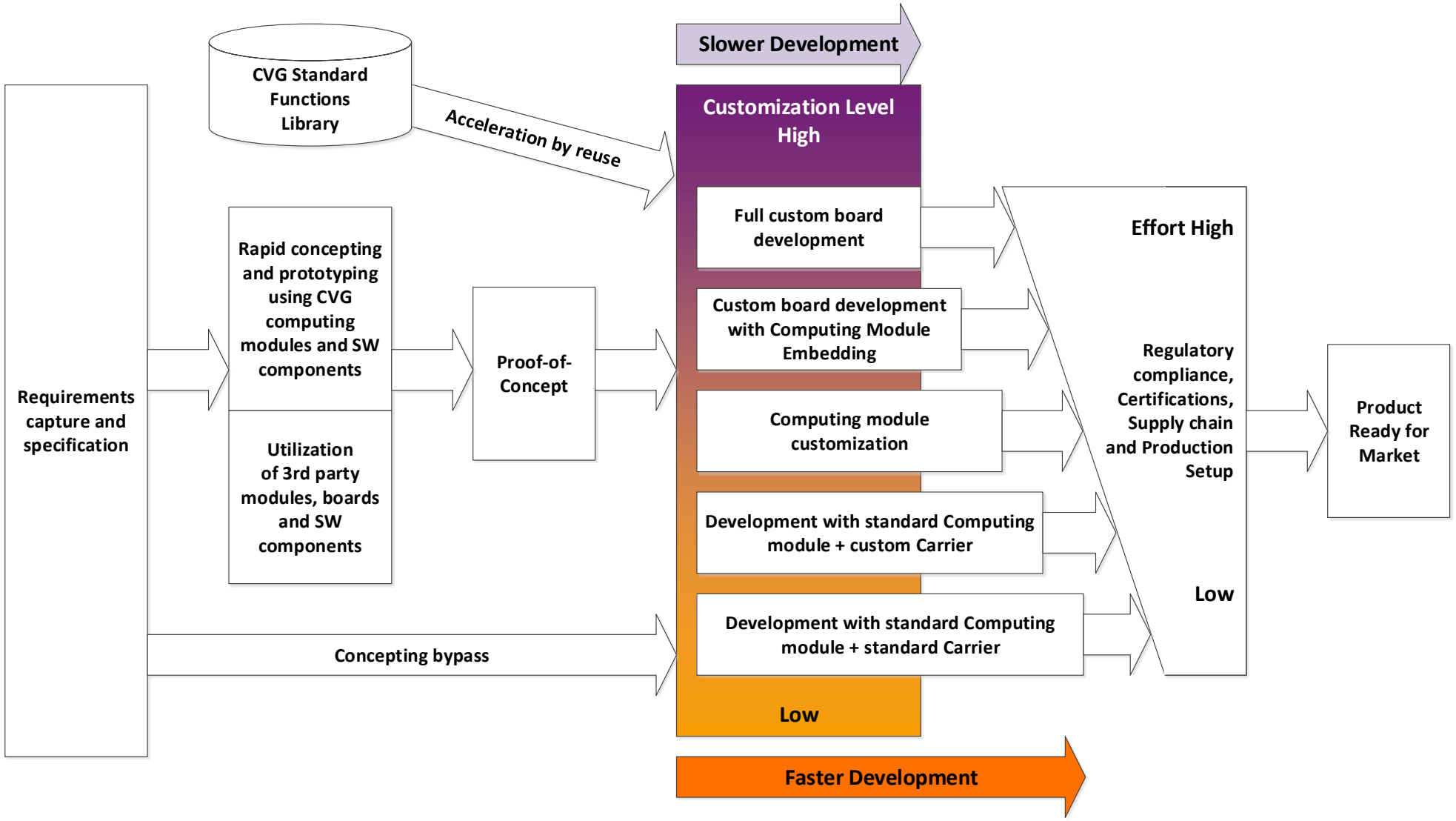
CVG Flex-Custom™ Accelerated Development Method

- Development method and process to accelerate time-to-market for embedded products
- Key elements: rapid concepting/prototyping, flexible customization and optimized compliance and production setup

- Rapid concepting/prototyping utilizes CVG computing modules, 3rd party modules, boards and software
- Flexible customization: combining CVG computing modules and other reusable design library functions and custom design

- The method can yield a development time reduction up to 50% as well as significant cost and risk reduction

CVG Flex-Custom™ Accelerated Development Method



Development With Flexible Customization Level

Flex-Custom™

Full Custom

Computing Modules (CM)

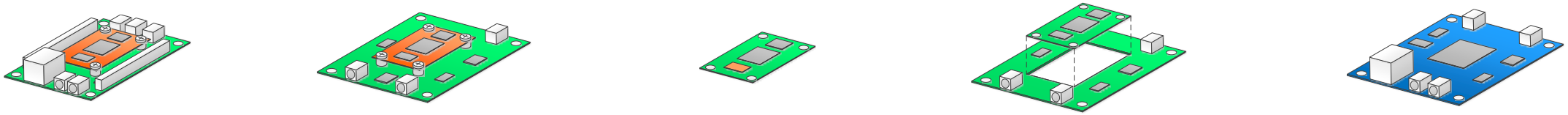
CM + Eval/Dev Carrier

CM + Custom Carrier

CM Customization
- From BOM variation to functional changes

CM Embedding
- Yields a single board solution without need to design the computing core

Full Custom Design
- Functionality and form factor design to fully customer specific requirements



Easy start gradual development path

Manufacturing & Lifecycle Services

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Reaching compliance

- Showstopper importance level – neglect can prohibit market entry completely or halt the business at an unforeseen timepoint
- Regulatory landscape is constantly evolving and requirements are generally getting tighter
- Staying on top requires significant time and effort, usually done by specialized personnel
- Declaration of conformity can work in EU, but not everywhere
- Further complexity, cost and needed time arises in function of needed market areas
- Cannot be worked around!

Reaching compliance

CVG Flex-Custom™ Accelerated Development Method offers the following help:

Module Certifications	Certifications can be (typically partially) carried over and applied to end product thus reducing the effort.
Design reuse	Risk of non-compliance reduced due to using tested and known good design.
Experience in worldwide certifications	Careful requirements analysis enables planning of combined testing to avoid overlap.
Established lab partners	Most types of testing can be arranged efficiently with tried and trusted partners.

Supply chain set up

- Product that cannot be delivered is useless to launch on market
- Proper supply chain setup is a key task already during the development
- Factors to be considered: quantity demand projection, order process, material and finished goods logistics and warehousing, capability requirements etc.
- Local manufacturing for responsiveness vs. suitability for mass production
- Quality assurance and control
- Production test procedures and systems, configuration and test data management
- Global sourcing, logistics and inventory management
- RMA process, spare parts

Supply chain set up

CVG Flex-Custom™ Accelerated Development Method offers the following help:

Focus on quality and reliability	Only qualified and reliable suppliers are used. Quality is key requirement and performance indicator
In-house production test development	Production test flow, procedures and automatic test systems can be developed at same with with the product
Experience in worldwide sourcing & manufacturing	Production location and material supply can be optimized for every product.
Established manufacturing & logistics partners	Most types of manufacturing can be arranged efficiently with tried and trusted partners.

Summary

- There is a gap between the fuzzy front end of product innovation and having a product market ready.
- Rapid prototyping is helping to narrow the gap but requirements for market entry are increasing.
- CVG offers the Flex-Custom™ Accelerated Development Method to bridge the gap with efficiency and certainty.

Story from the trenches - outcome

- Grossly underestimated effort to bring product to market from current level
- Market entry requirements were not clear at all
- Luckily they came to right place for help
- Yielded a major development project with complex certification and type approval phase
- Manufacturing was set up with our existing partner network
- Product entered the planned markets succesfully
- Despite of vastly bigger project than the customer had anticipated, utilizing CVG Flex-Custom™ Method helped to cap the additional time and cost to a reasonable level

Thank You!

FOR FURTHER INFORMATION,
PLEASE CONTACT

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