



# Revolution in Software Development with Generative AI?

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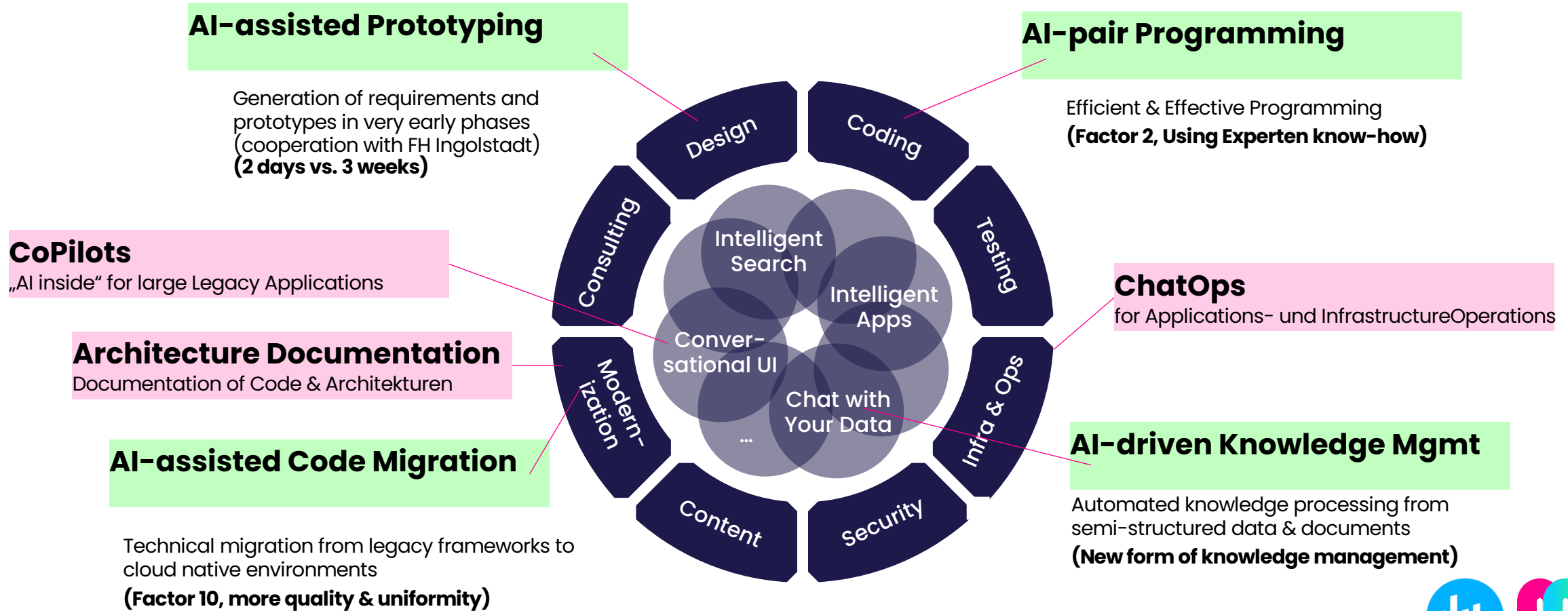


# 1 A Glimpse into Today's Praxis with AI-based Software Development





# What potentials we can already confirm - and what we are tackling in concrete projects



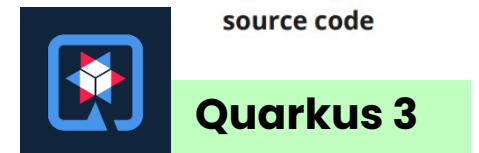
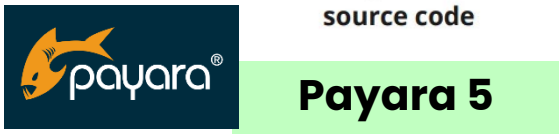
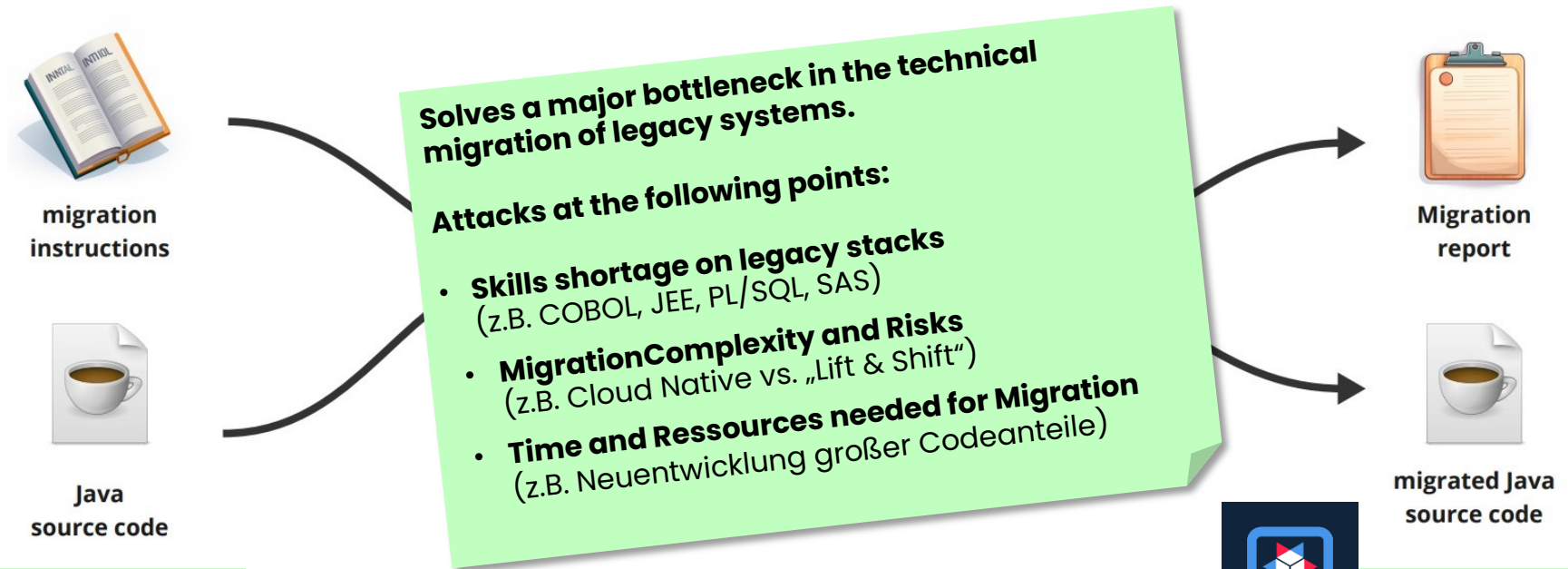
# Lets deep dive into AI-assisted Code Migration

## Input

- **instruction manual** – Concise migration steps, written in plain English
- **java source code** – existing unmigrated code

## Output

- **java source code** – migrated code to the new framework
- **migration report** – detailed change report



# First you need basic instructions and a “cookbook” to instruct the LLM what to do

You are provided a payara 5 java file (source). Your task is to migrate the source file to quarkus 3 by respecting rules listed below.

## General rules

- DO NOT remove any comments or java doc
- Remember that the examples in the rules are just to help you understand the rule
- Your response must contain the complete (uncut) migrated class (java file).
- Remove the `@Inject` annotation when it is set in conjunction with `@ConfigProperty`
- Respond in the following format:

```
```java
<code>
```
```markdown
<explanation & reasoning in bullet points>
```
```

- Respect the Cookbook migration rules



Then you write a  
“cookbook” which is a very  
specific set of instructions.

It is what you would tell a  
junior Dev in Natural  
Language



### - API Documentation with Swagger

During migration, we will get rid of the `import io.swagger.annotations.*` imports and use the Microprofile's OpenAPI. Change the Swagger Annotations as follows:

```
import io.swagger.annotations.SwaggerDefinition;  
import io.swagger.annotations.Tag;  
import io.swagger.annotations.Api;  
@SwaggerDefinition(tags = @Tag(name = "Partfamily"))  
@Api(tags = "Partfamily")
```

becomes

```
import org.eclipse.microprofile.openapi.annotations.tags.Tag;  
@Tag(name = "Partfamily")
```

### - Migrating BE

The Payara services does not use lombok and for the migration we will use the lombok annotations. Add `@Builder`, `@AllArgsConstructor` and `@NoArgsConstructor`. You must delete the unneeded methods that lombok annotations replace.

### - Base Entities from ijix-technical-base

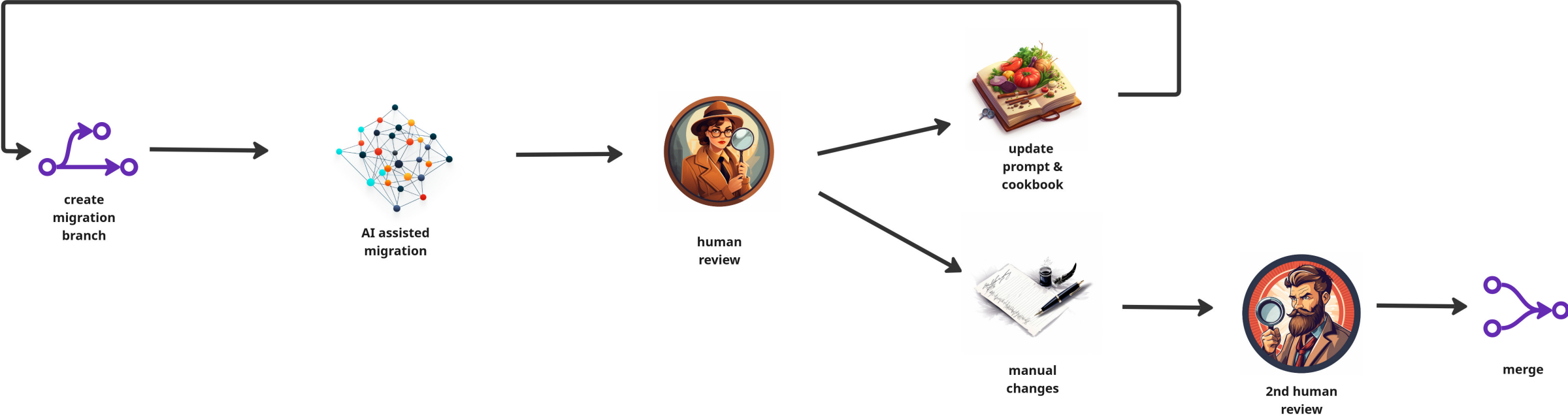
change the classes imported from this path

```
import com.bmw.otd.ijix.common.entity.*;
```

to

```
import com.bmw.otd.ijix<service_name>.common.persistence.*;
```

# This is how the final workflow looks in detail:







## Results

1. x10 more efficient
2. Devs are very happy – no one loved repetitive work anyway
3. You need very skilled Devs and Architects – AI does not replace the need for Software Engineers







2

# The Evolution of Software Production

Is AI-based Coding the Beginning of a New Era?



# Huge Gap: World Problem Language → Machine Language



World Problem

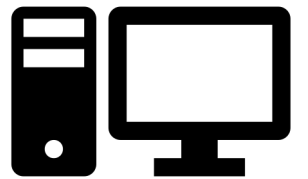


Developer



```
; Accepts a number in register AX;  
; subtracts 32 if it is in the range 97-122;  
; otherwise leaves it unchanged.  
  
SUB32 PROC          ; procedure begins here  
    CMP AX,97      ; compare AX to 97  
    JL  DONE      ; if less, jump to DONE  
    CMP AX,122     ; compare AX to 122  
    JG  DONE      ; if greater, jump to DONE  
    SUB AX,32      ; subtract 32 from AX  
DONE: RET          ; return to main program  
SUB32 ENDP         ; procedure ends here
```

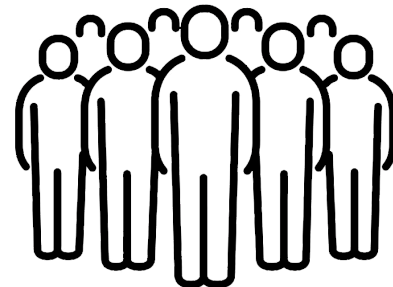
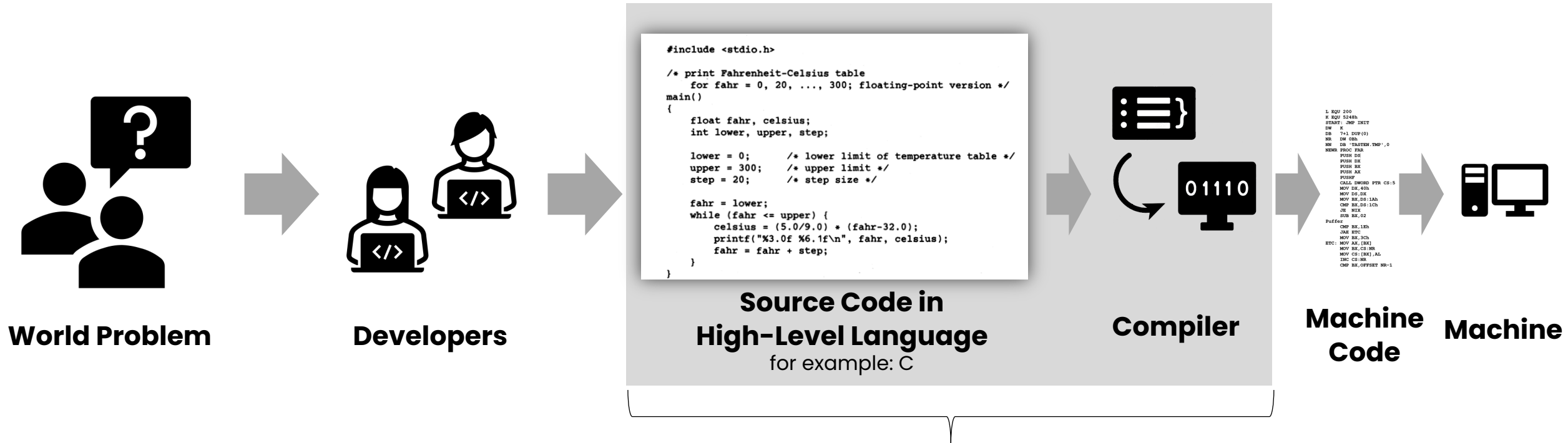
Machine Code  
(Assembler)



Machine



# Reducing the Gap by Abstracting from Machine Code

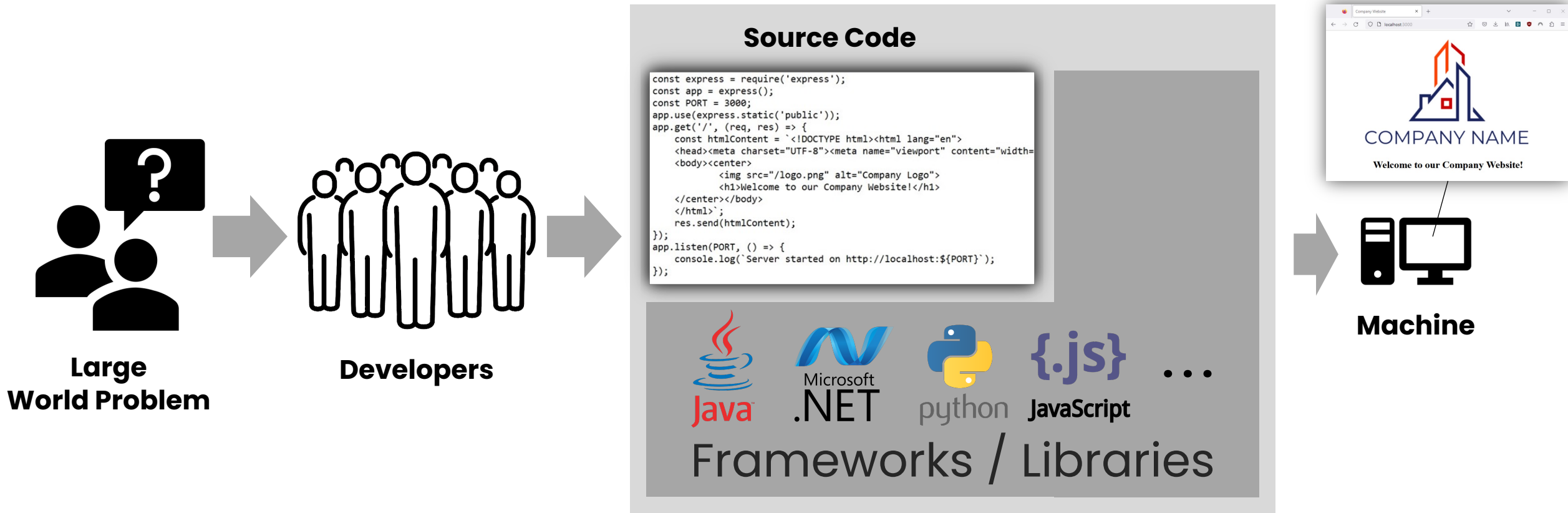


**Enables a New Era:**  
Collaborative Development &  
Large-Scale Software Projects



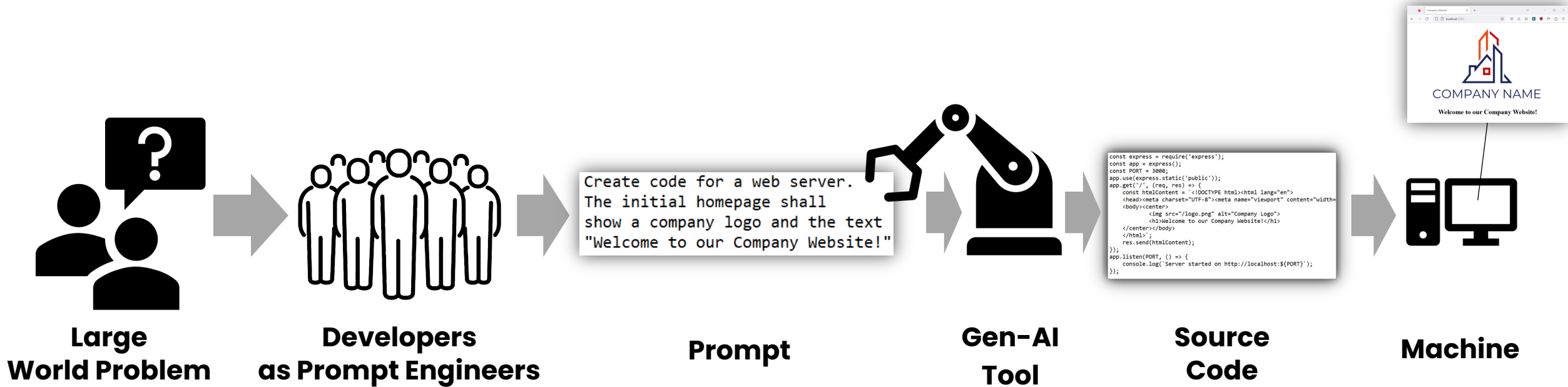


# Reducing the Gap: Out-of-the-Box Solutions for Recurring Problems



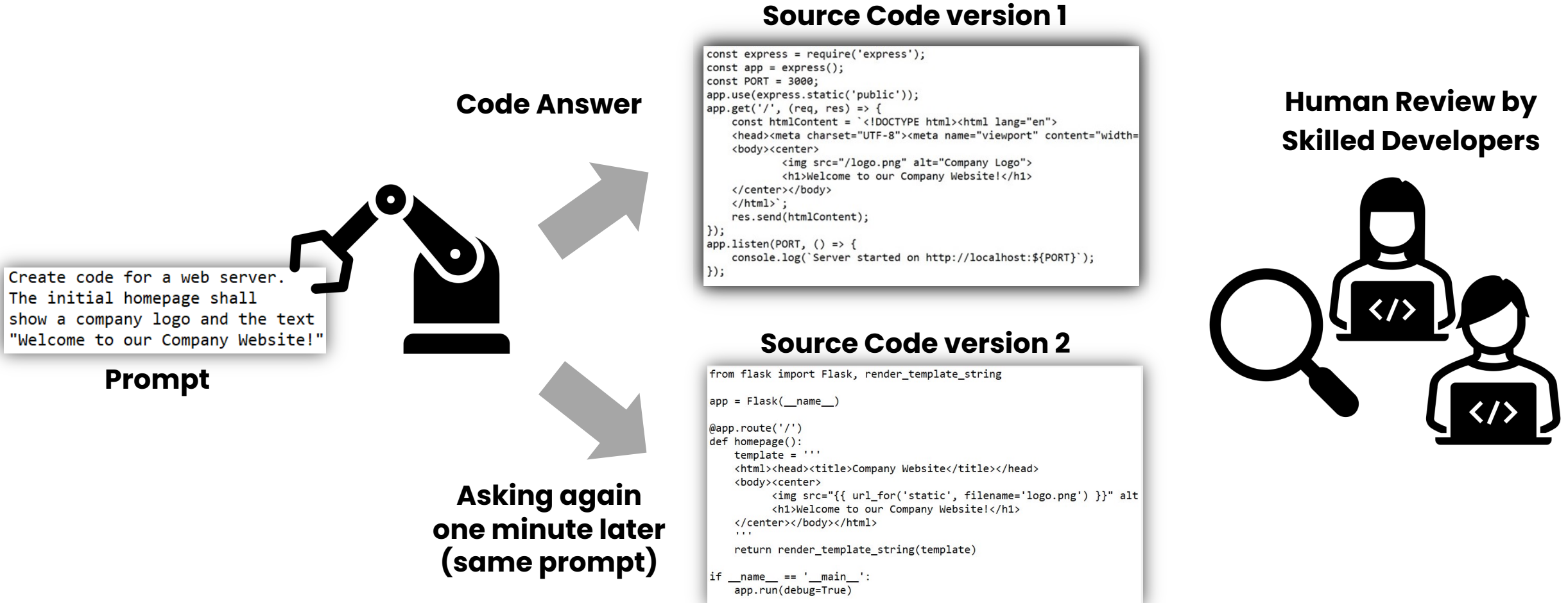
Introducing Generative AI for Code Production

# A New Era with Gen-AI: Programming in Human Language



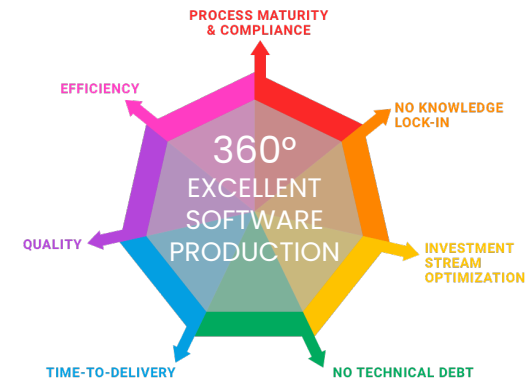
# Dangerous Pitfalls of Gen-AI Code Production

## Result of Generative AI is not Deterministic

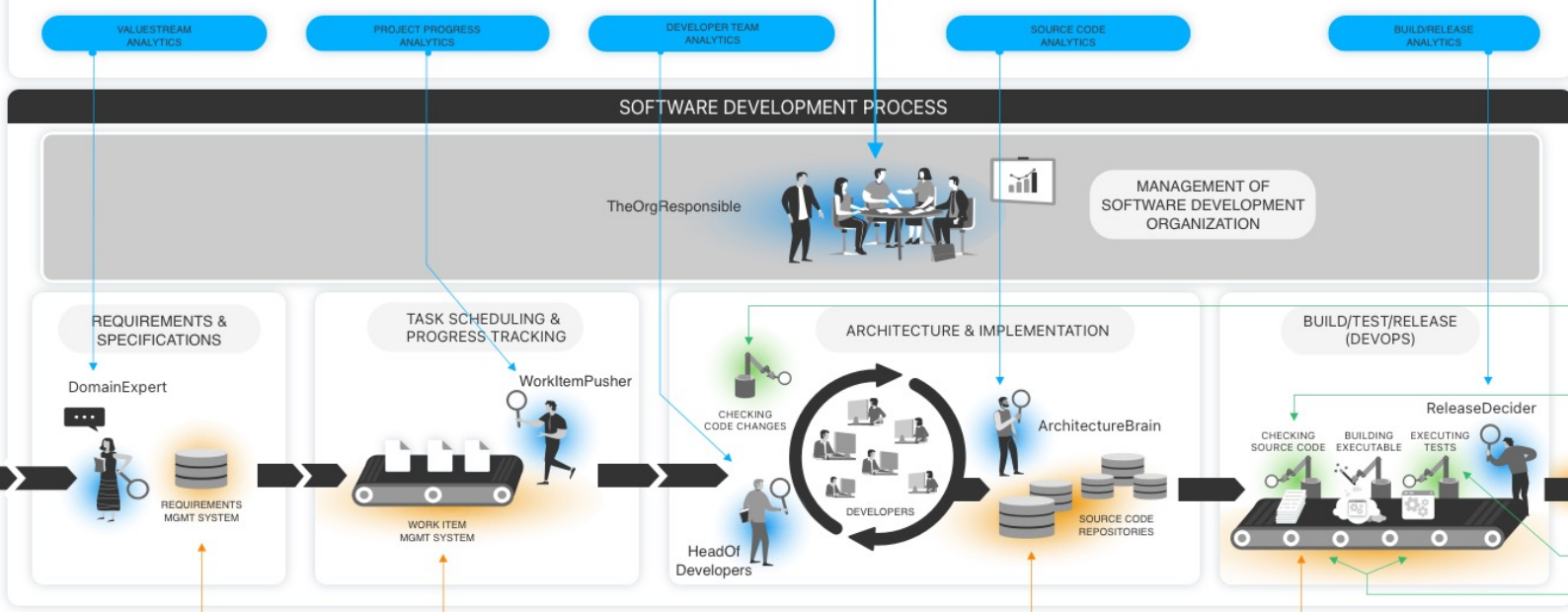




# Seerene: Measuring & Optimizing Software Production



## MEASUREMENT AND STEERING OF SOFTWARE PRODUCTION



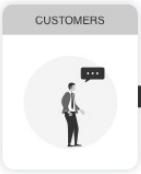
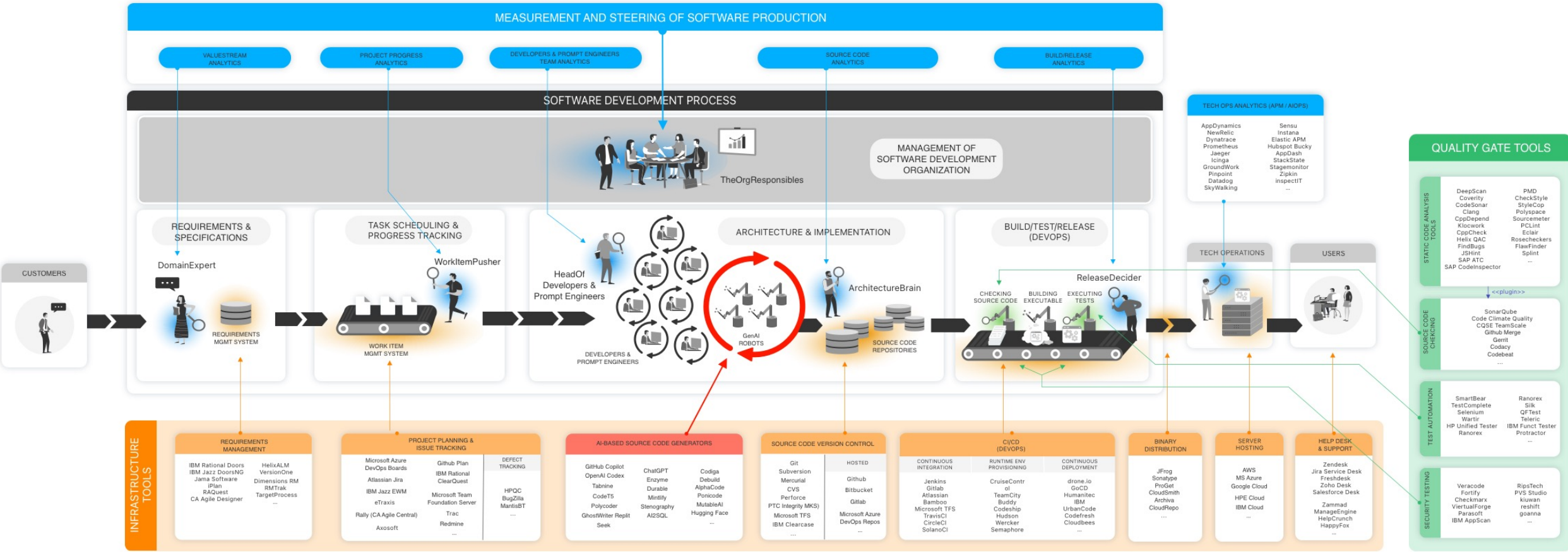
| INFRASTRUCTURE TOOLS | REQUIREMENTS MANAGEMENT |               |                 | PROJECT PLANNING & ISSUE TRACKING |                                  |                    | SOURCE CODE VERSION CONTROL  |               |                        | CI/CD (DEVOPS)            |                       |              | BINARY DISTRIBUTION | SERVER HOSTING | HELP DESK & SUPPORT |
|----------------------|-------------------------|---------------|-----------------|-----------------------------------|----------------------------------|--------------------|------------------------------|---------------|------------------------|---------------------------|-----------------------|--------------|---------------------|----------------|---------------------|
|                      | IBM Rational Doors      | HelixALM      | Defect Tracking | Microsoft Azure                   | GitHub Plan                      | Git                | IBM Clearcase                | HOSTED        | CONTINUOUS INTEGRATION | RUNTIME ENVY PROVISIONING | CONTINUOUS DEPLOYMENT | JFrog        |                     |                |                     |
|                      | IBM Jazz DoorsNG        | VersionOne    | HPQC            | DevOps Boards                     | IBM Rational ClearQuest          | Subversion         | GitHub                       | Jenkins       | CruiseContr ol         | drone.io                  | Sonatype              | MS Azure     | Jira Service Desk   |                |                     |
|                      | Jama Software           | Dimensions RM | HPCC            | Atlassian Jira                    | IBM Rational ClearQuest          | Mercurial          | Bitbucket                    | Atlassian     | TeamCity               | GoCD                      | ProGet                | Google Cloud | Jira Service Desk   |                |                     |
|                      | iPlan                   | RMTrak        | ...             | IBM Jazz EWM                      | Microsoft Team Foundation Server | CVS                | Gitlab                       | Bamboo        | Buddy                  | Humanitec                 | CloudSmith            | HPE Cloud    | Freshdesk           |                |                     |
|                      | CA Agile Designer       | TargetProcess | ...             | eTraxis                           | Foundation Server                | PTC Integrity MKS) | Gitlab                       | Microsoft TFS | Hudson                 | IBM                       | Archiva               | IBM Cloud    | Zoho Desk           |                |                     |
|                      |                         |               | ...             | Rally (CA Agile Central)          | Trac                             | ...                | Microsoft Azure DevOps Repos | TravisCI      | Wercker                | UrbanCode                 | CloudRepo             | ...          | Salesforce Desk     |                |                     |
|                      |                         |               |                 | Axosoft                           | Redmine                          | ...                | ...                          | CircleCI      | Semaphore              | Codefresh                 | ...                   | ...          | HelpDesk            |                |                     |
|                      |                         |               |                 |                                   |                                  |                    |                              | SolanoCI      |                        | Cloudbees                 |                       |              | IBM Funct Tester    |                |                     |
|                      |                         |               |                 |                                   |                                  |                    |                              |               |                        |                           |                       |              | Protractor          |                |                     |
|                      |                         |               |                 |                                   |                                  |                    |                              |               |                        |                           |                       |              | ...                 |                |                     |

| QUALITY GATE TOOLS             |   |
|--------------------------------|---|
| CHANGE CHECKING (MERGE REVIEW) | Github Merge<br>Gerrit<br>Codacy<br>Codebeat<br>...   |
| STATIC CODE ANALYSIS TOOLS     | DeepScan<br>Coverity<br>CodeSonar<br>Clang<br>CppDepend<br>Klocwork<br>CppCheck<br>Helix QAC<br>FindBugs<br>JSHint<br>SAP ATC<br>SAP Codeinspector<br>PMD<br>CheckStyle<br>StyleCop<br>Polyspace<br>SourceMeter<br>PCLint<br>Eclai<br>Rosecheckers<br>FlawFinder<br>Splint<br>... |
| SOURCE CODE CHECKING           | SonarQube<br>Code Climate<br>Quality<br>CQSE<br>TeamScale<br>...  |
| TEST AUTOMATION                | SmartBear<br>TestComplete<br>Selenium<br>Wartir<br>HP Unified Tester<br>Ranorex<br>Ranorex<br>Silk<br>QFTest<br>Teleric<br>IBM Funct Tester<br>Protractor<br>...  |
| SECURITY TESTING               | Veracode<br>Fortify<br>Checkmarx<br>VirtualForge<br>Parasoft<br>IBM AppScan<br>Ripstech<br>PVS Studio<br>Kiuwan<br>reshift<br>ganna<br>...  |

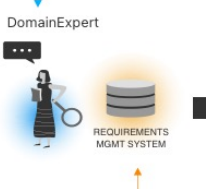
# Seerene: Measuring Software Production in the Age of Gen-AI



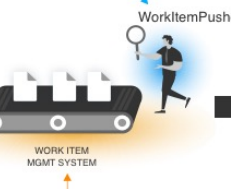
## MEASUREMENT AND STEERING OF SOFTWARE PRODUCTION



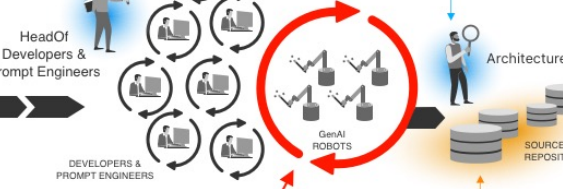
### REQUIREMENTS & SPECIFICATIONS



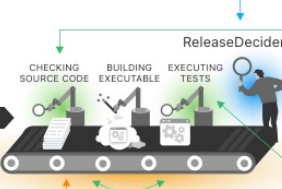
### TASK SCHEDULING & PROGRESS TRACKING



### ARCHITECTURE & IMPLEMENTATION



### BUILD/TEST/RELEASE (DEVOPS)



### INFRASTRUCTURE TOOLS

- #### REQUIREMENTS MANAGEMENT
- IBM Rational Doors
  - IBM Jazz DoorsNG
  - Jama Software
  - iPlan
  - RAQuest
  - CA Agile Designer
  - HelixALM
  - VersionOne
  - Dimensions RM
  - RMTrak
  - TargetProcess

- #### PROJECT PLANNING & ISSUE TRACKING
- Microsoft Azure DevOps Boards
  - Atlassian Jira
  - IBM Jazz EWM
  - eTraxis
  - Rally (CA Agile Central)
  - Axosoft
  - GitHub Plan
  - IBM Rational ClearQuest
  - Microsoft Team Foundation Server
  - Foundation Server
  - Trac
  - Redmine
- #### DEFECT TRACKING
- HPOC
  - BugZilla
  - ManisBT
  - ...

- #### AI-BASED SOURCE CODE GENERATORS
- GitHub Copilot
  - OpenAI Codex
  - Tabnine
  - CodT5
  - PolyCoder
  - GhostWriter
  - Replit
  - Seek
  - ChatGPT
  - Enzyme
  - Durable
  - Mintlify
  - Slemography
  - AIRSQL
  - Codiga
  - Debuild
  - AlphaCode
  - Poncode
  - MutabieAI
  - Hugging Face

- #### SOURCE CODE VERSION CONTROL
- | NON-HOSTED  | HOSTED   |
|---|--|
| <ul style="list-style-type: none"> <li>Git</li> <li>Subversion</li> <li>Mercurial</li> <li>CVS</li> <li>Perforce</li> <li>PTC Integrity (AKS)</li> <li>Microsoft TFS</li> <li>IBM Clearcase</li> <li>...</li> </ul> | <ul style="list-style-type: none"> <li>GitHub</li> <li>Bitbucket</li> <li>Gitlab</li> <li>Microsoft Azure DevOps Repos</li> <li>...</li> </ul> |

- #### CI/CD (DEVOPS)
- | CONTINUOUS INTEGRATION   | RUNTIME ENV PROVISIONING  | CONTINUOUS DEPLOYMENT  |
|--|---|--|
| <ul style="list-style-type: none"> <li>Jenkins</li> <li>Gitlab</li> <li>Altassian Bamboo</li> <li>Microsoft TFS</li> <li>TravisCI</li> <li>CircleCI</li> <li>SolanoCI</li> </ul> | <ul style="list-style-type: none"> <li>CruiseContr ol</li> <li>TeamCity</li> <li>Buddy</li> <li>CodeShip</li> <li>Hudson</li> <li>Wercker</li> <li>Semaphore</li> </ul> | <ul style="list-style-type: none"> <li>drone.io</li> <li>GoCD</li> <li>Humanitec</li> <li>IBM</li> <li>UrbanCode</li> <li>Codefresh</li> <li>Cloudbees</li> <li>...</li> </ul> |

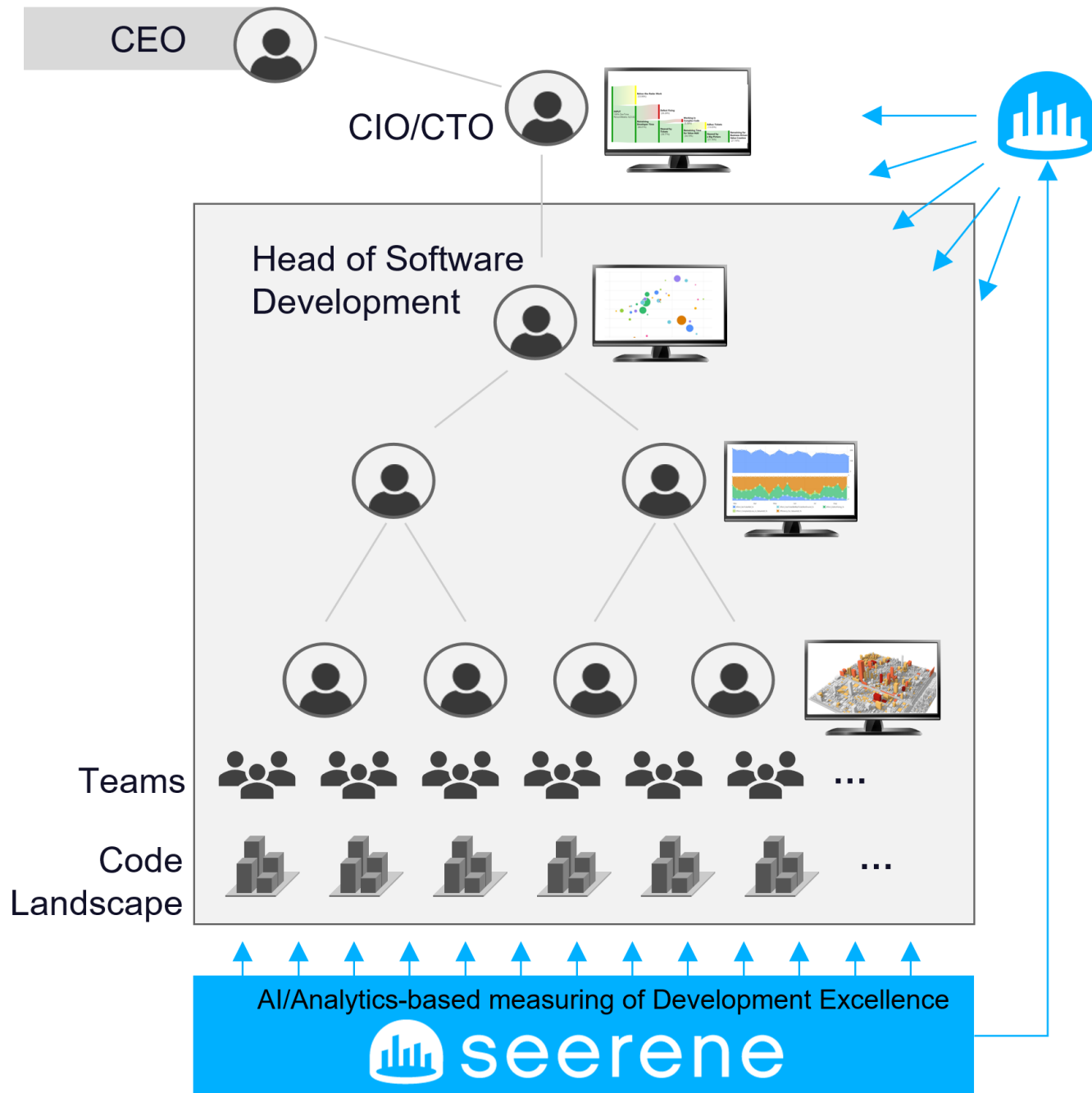
- #### BINARY DISTRIBUTION
- JFrog
  - Sonatype
  - ProGet
  - CloudSmith
  - Archiva
  - CloudRepo
  - ...

- #### SERVER HOSTING
- AWS
  - MS Azure
  - Google Cloud
  - HPE Cloud
  - IBM Cloud
  - ...

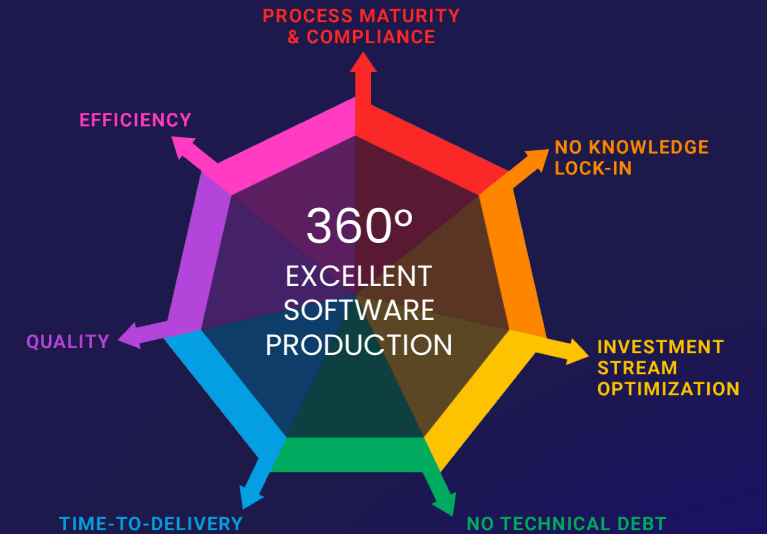
- #### HELP DESK & SUPPORT
- Zendesk
  - Jira Service Desk
  - Freshdesk
  - Zoho Desk
  - Salesforce Desk
  - Zammad
  - ManageEngine
  - HelpCrunch
  - HappyFox
  - ...

### QUALITY GATE TOOLS

- #### STATIC CODE ANALYSIS TOOLS
- DeepScan
  - Coverity
  - CodeSonar
  - Clang
  - CppDepend
  - Klocwork
  - CppCheck
  - Helix QAC
  - FindBugs
  - JSHint
  - SAP ATC
  - SAP CodeInspector
  - PMD
  - CheckStyle
  - StyleCop
  - Polyspace
  - Sourcemet
  - PCLint
  - Eclat
  - Rosecheckers
  - FlawFinder
  - Splint
  - ...
- #### SOURCE CODE CHECKING
- SonarQube
  - Climate
  - Quality
  - CQSE
  - TeamScale
  - GitLab Merge
  - Genit
  - Codeacy
  - Codebeat
  - ...
- #### TEST AUTOMATION
- SmartBear
  - TestComplete
  - Selenium
  - WarTir
  - HP Unified Tester
  - Ranorex
  - Ranorex
  - Silk
  - QFTest
  - Telerik
  - IBM Funct Tester
  - Protector
  - ...
- #### SECURITY TESTING
- Veracode
  - Fortify
  - Checkmarx
  - VirtualFortige
  - Parasoft
  - IBM AppScan
  - Ripstech
  - PVS Studio
  - kiuwan
  - reshift
  - goanna
  - ...



# Leading the Software Development Org to highest Excellence



Assuring Gen-AI Productivity Gains  
but also  
Mitigating the inherent Risks of Gen-AI





# How do you steer the use of Gen-AI in your Software Dev Org?

## Thanks for your attention

