**Table A1.** Summary of the Survey Results and Continental Comparison

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| **Section** | **Survey Question** | **Type of Answers** | **Results** | | | | |
|  | **Overall** | **Eastern Europe** | **Western Europe** | **America** |
| 2 | What is the origin of  your current organization? | Free text field | - | - | 73% | 12% | 12% |
| What is your formal undergraduate education? | Single answer from a list | Computer Engineering | 72% | 71% | 87.5% | 62.5% |
| Computer Science | 6% | 4% | 12.5% | 0% |
| Software Engineering | 4% | 4% | 0% | 12.5% |
| Electrical and Electronics Engineering | 5% | 4% | 0% | 0% |
| Information Systems | 4% | 4% | 0% | 12.5% |
| Other | 9% | 17% | 0% | 12.5% |
| What is your latest formal graduate education? | Single answer from a list | Computer Engineering | 42% | 49% | 25% | 25% |
| Computer Science | 10% | 8% | 25% | 0% |
| Software Engineering | 5% | 0% | 12.5% | 25% |
| Information Systems | 6% | 12% | 0% | 12.5% |
| Other | 10% | 7% | 0% | 25% |
| None | 27% | 24% | 37.5% | 12.5% |
| What is your role in your organization? | Single answer from a list | Developer | 46% | 49% | 50% | 25% |
| Senior Developer | 19% | 20% | 12.5% | 25% |
| Software Architect | 10% | 8% | 12.5% | 12.5% |
| Project Manager | 10% | 6% | 0% | 25% |
| Analyst | 3% | 2% | 0% | 12.5% |
| Other | 12% | 15% | 25% | 0% |
| How long (in years) have you been working in your current role? | Free text field | Minimum | 0.2 | 0.2 | 0 | 1 |
| Maximum | 15 | 15 | 3 | 6 |
| Mean | 2.95 | 3.09 | 1.56 | 2.63 |
| Median | 2 | 2 | 1.25 | 2 |
| Mode | 1 | 1 | 1 | 2 |
| Standard Deviation | 3.10 | 3.36 | 1.05 | 1.69 |
| How long (in years) have you been working in the software field? | Free text field | Minimum | 0.2 | 0.2 | 1 | 3 |
| Maximum | 3 | 30 | 14 | 27 |
| Mean | 6.50 | 5.98 | 5.13 | 10.13 |
| Median | 3 | 3 | 3 | 8.5 |
| Mode | 2 | 2 | 3 | 3 |
| Standard Deviation | 6.61 | 6.61 | 4.76 | 8.18 |
| Do you have any experience with microservice-based  architectures? | Single answer from a list | Yes | 67% | 63% | 62.5% | 87.5% |
| No | 33% | 37% | 37.5% | 12.5% |
| 3 | How long (in years) have you been working with microservices? | Free text field | Minimum | 0.3 | 0.3 | 1 | 1 |
| Maximum | 10 | 10 | 4 | 8 |
| Mean | 2.40 | 2.33 | 2 | 2.86 |
| Median | 2 | 2 | 2 | 2 |
| Mode | 1 | 1 | 1 | 1 |
| Standard Deviation | 1.90 | 1.88 | 1.22 | 2.54 |
| What is the domain of your current (if finished, the last) | Single answer from a list | Finance | 36% | 48% | 20% | 0% |
| Telecom | 9% | 13% | 0% | 0% |
| Mobile Software | 7% | 10% | 0% | 0% |

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|  | microservice-based project? |  | Web-based productivity apps | 4% | 0% | 20% | 29% |
| E-commerce | 4% | 6% | 0% | 14% |
| Other | 40% | 23% | 60% | 57% |
| What is the type of your current (if finished, the last) microservice-based project? | Single answer from a list | A new microservice based system  development | 47% | 39% | 80% | 57% |
| Re-implementing a  monolithic system from scratch as microservices | 36% | 45% | 20% | 14% |
| Re-engineering parts of a system as microservices to work  with a monolith | 16% | 13% | 0% | 29% |
| Re-platforming an  already microservice based system | 2% | 3% | 0% | 0% |
| Which software development methodology you followed when working with microservices if you  followed any? | Multiple answers from a list | Scrum | 53% | 68% | 80% | 57% |
| Kanban | 24% | 35% | 20% | 29% |
| Extreme Programming | 9% | 13% | 20% | 14% |
| What is the team size (total number of personnel) on your current (if finished, the last) microservice- based project? | Free text field | Minimum | 2 | 2 | 3 | 3 |
| Maximum | 50 | 50 | 34 | 30 |
| Mean | 9.3 | 8.61 | 10.2 | 12.29 |
| Median | 5 | 5 | 4 | 10 |
| Mode | 5 | 5 | 4 | 8 |
| Standard Deviation | 9.43 | 9.42 | 13.35 | 8.61 |
| How many microservice-based projects are running concurrently in your organization? | Free text field | Minimum | 1 | 1 | 0 | 3 |
| Maximum | 1300 | 75 | 23 | 1300 |
| Mean | 40.11 | 12.48 | 7.8 | 221.17 |
| Median | 5 | 4 | 2 | 6 |
| Mode | 1 | 1 | - | - |
| Standard Deviation | 194.96 | 17.78 | 9.98 | 528.53 |
| Do developers in your organization generally work on one project at a time or do they work on multiple projects at  a time? | Single answer from a list | Multiple projects at a time | 60% | 61% | 60% | 71% |
| One project at a time | 40% | 39% | 40% | 29% |
| Do you utilize DevOps  in your organization in general? | Single answer from a list | Yes | 84% | 84% | 100% | 71% |
| No | 16% | 16% | 0% | 29% |
| Which automated integration and automated deployment tools you use if you  use any? | Free text field | Jenkins | 32% | 42% | 20% | 29% |
| Azure DevOps | 12% | 10% | 20% | 43% |
| None | 7% | 13% | 0% | 0% |
| What is the level of test automation in your current (if finished, the last) microservice- based project? | Likert scale | 1 | 4% | 6% | 0% | 0% |
| 2 | 20% | 19% | 20% | 29% |
| 3 | 22% | 23% | 20% | 14% |
| 4 | 36% | 35% | 60% | 14% |
| 5 | 18% | 16% | 0% | 43% |
| What was the most critical challenge you experienced in your software development process when working | Single answer from a list | The complexity of  decomposing a monolithic system | 36% | 29% | 20% | 57% |
| Managing transactional  processes where multiple services need to | 36% | 42% | 20% | 43% |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | with microservices in your opinion? |  | commit/rollback changes together |  |  |  |  |
| Managing asynchronous communication among services | 16% | 16% | 20% | 0% |
| Database migration and data splitting | 7% | 6% | 20% | 0% |
| 4 | Which software size measurement method have you used in your current (if finished, the last) microservice- based project if you used any? | Single answer from a list | Story Points | 38% | 45% | 20% | 14% |
| T-shirt Size | 18% | 16% | 0% | 29% |
| Source Lines of Code | 9% | 10% | 0% | 14% |
| Use Case Points | 9% | 10% | 20% | 0% |
| Functional User Requirements | 4% | 0% | 0% | 14% |
| None | 22% | 19% | 60% | 14% |
| How do you perform effort estimation in your current (if finished, the last) microservice-based project? | Single answer from a list | Planning Poker | 31% | 42% | 20% | 0% |
| Expert Judgement | 24% | 19% | 20% | 57% |
| Ad-hoc | 16% | 10% | 40% | 29% |
| Parametric Estimation | 11% | 16% | 0% | 0% |
| Organization-wide Prediction | 7% | 6% | 0% | 14% |
| Team Discussion | 2% | 0% | 0% | 0% |
| None | 9% | 6% | 20% | 0% |
| How do you perform effort estimation in your current (if finished, the last) microservice-based project? | Multiple answers from a list | Development Effort | 91% | 90% | 80% | 100% |
| Test Effort | 76% | 71% | 60% | 100% |
| Analysis Effort | 58% | 61% | 40% | 57% |
| Design Effort | 51% | 45% | 40% | 71% |
| Operations Effort | 38% | 29% | 60% | 57% |
| Effort not estimated | 11% | 6% | 20% | 0% |
| Have you been able to predict effort more precisely when utilizing microservice architectures? | Likert scale | 1 | 7% | 3% | 20% | 14% |
| 2 | 13% | 10% | 20% | 29% |
| 3 | 29% | 32% | 40% | 0% |
| 4 | 42% | 48% | 20% | 29% |
| 5 | 9% | 7% | 0% | 29% |
| Have you observed changes in the eefficiency of the effort estimation process when utilizing  microservices architectures? | Likert scale | 1 | 2% | 0% | 20% | 0% |
| 2 | 8% | 6% | 20% | 14% |
| 3 | 51% | 55% | 40% | 29% |
| 4 | 25% | 23% | 20% | 43% |
| 5 | 14% | 16% | 0% | 14% |
| How frequently is actual individual effort recorded in your organization? | Single answer from a list | Daily | 31% | 42% | 0% | 14% |
| Weekly | 26% | 26% | 20% | 29% |
| Biweekly | 7% | 6% | 20% | 0% |
| Monthly | 9% | 10% | 20% | 0% |
| At the end of the task | 2% | 0% | 0% | 0% |
| Effort not recorded | 22% | 13% | 40% | 57% |
| 5 | Does your organization utilize a standard process for software  analysis in general? | Single answer from a list | Yes | 60% | 68% | 40% | 43% |
| No | 40% | 22% | 60% | 57% |
| How have you depicted the functional requirements in your current (if finished, the last) microservice- based project? | Multiple answers from a list | User Stories | 69% | 71% | 40% | 57% |
| Use Case Scenarios | 36% | 26% | 80% | 57% |
| Unstructured/ Natural Language | 29% | 26% | 40% | 29% |
| Use Case Diagram | 16% | 16% | 20% | 14% |
| EPC | 2% | 3% | 0% | 0% |
| Docstring | 2% | 3% | 0% | 0% |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | None | 2% | 3% | 0% | 0% |
| How have you analyzed the problem for your current (if finished, the last) microservice-based project? | Multiple answers from a list | Event-storming | 36% | 42% | 40% | 14% |
| Ad-hoc | 33% | 32% | 40% | 43% |
| Event-based Modeling | 31% | 29% | 60% | 14% |
| BPMN | 2% | 3% | 0% | 0% |
| None | 29% | 26% | 0% | 43% |
| Which notations have you used to analyze your current (if finished, the last) microservice-based project? | Multiple answers from a list | Flow Chart | 53% | 52% | 60% | 43% |
| Activity Diagram | 38% | 26% | 20% | 43% |
| eEPC | 4% | 3% | 0% | 14% |
| Mind Map | 2% | 3% | 0% | 0% |
| Value Stream Maps | 2% | 3% | 0% | 0% |
| None | 31% | 29% | 40% | 43% |
| How have you decomposed the problem into microservices in your current (if finished, the last) microservice-  based project? | Single answer from a list | Decompose by Business Capability | 27% | 26% | 20% | 29% |
| Decompose by Bounded Context | 73% | 74% | 80% | 71% |
| 6 | Which notations have you used to represent the design of your current (if finished, the last) microservice- based project? | Multiple answers from a list | Sequence Diagram | 58% | 58% | 40% | 57% |
| Class Diagram | 51% | 32% | 80% | 57% |
| Activity Diagram | 38% | 19% | 60% | 43% |
| ER Diagram | 27% | 10% | 40% | 29% |
| None | 18% | 19% | 20% | 14% |
| Which patterns have you utilized in your current (if finished, the last) microservice- based project? | Multiple answers from a list | Event Sourcing | 58% | 48% | 80% | 100% |
| Circuit Breaker | 51% | 19% | 60% | 43% |
| CQRS | 36% | 16% | 60% | 14% |
| Bulkhead | 2% | 3% | 0% | 0% |
| API Gateway | 2% | 3% | 0% | 0% |
| None | 4% | 6% | 0% | 0% |