State of Dapr

2023

PRESENTED BY

Introduction

Dapr (**D**istributed **Ap**plication **R**untime) is an open source project under the Cloud Native Computing Foundation (CNCF). Dapr provides developers with a set of APIs, commonly known as “building blocks”, that abstract away the complexity of common challenges that developers encounter regularly when building distributed applications.

Dapr has seen exponential growth since its inception in late 2019, boasting an active Discord community with over 6,500 members, 2,900 contributors and 22,300 Github stars. Dapr ranks 10th of 157 projects in the CNCF and is one of the most popular developer projects. Enterprises using Dapr include IBM, Microsoft, Zeiss, Alibaba Cloud, BOSCH, Sharperimage.com, Intel, Tencent, Ignition Group, Dotmatics, Wortell, Huawei, Legentic, At-Bay, and HDFC to name a few.

With this first annual survey of the Dapr landscape, we wanted to understand the current state and trajectory of Dapr among developers and enterprises, the factors driving its success, and challenges to be addressed. By sharing this data with the Dapr community and beyond, our goal is to provide you with insight into how your peers are using Dapr, share the benefits of Dapr with those considering adopting it, and to provide feedback to the project and ecosystem that can influence roadmap, contributions, and resources.

Demographics

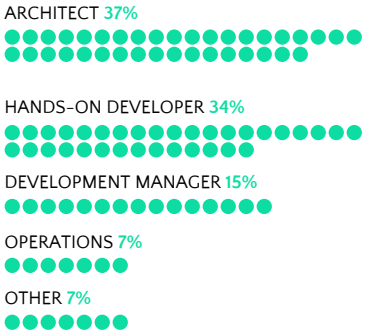
Our study surveyed active Dapr developers, architects and managers across organizations of different sizes. Diagrid commissioned Dimensional Research to conduct the study to understand the experiences and attitudes of the individuals responsible for adoption and use of Dapr in each organization. The survey included a total of 151 individuals, each of whom has a role that involves daily use of Dapr.

A wide range of roles, industries, regions, and job levels are represented. A majority (54%) of those surveyed consider themselves very knowledgeable or expert in Dapr. The same proportion (54%) served as the final decision maker when choosing the technology.

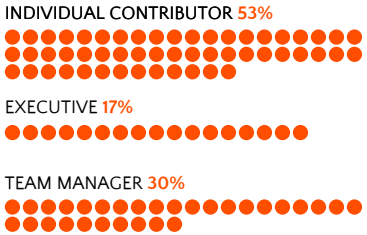
This research covers a wide range of industries including technology companies (35%) and financial services companies (13%). All major sectors are represented, including transportation (6%), retail (6%), healthcare (6%), and energy and utilities (4%).

In addition, a series of in-depth interviews were conducted with ten Dapr users to gain an understanding of the nuances of Dapr adoption and use. Quotes from those interviews are included, edited for readability where necessary.

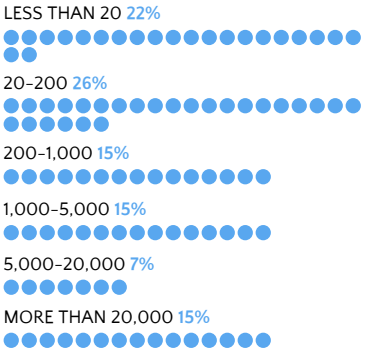
ROLE



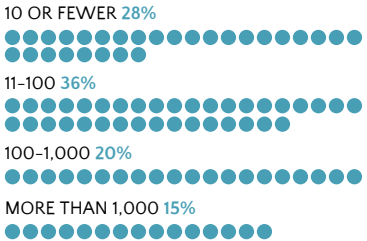
JOB LEVEL



COMPANY SIZE



OF DEVELOPERS



Dapr In Action

One of the biggest things we wanted to learn from this survey is how Dapr stakeholders are choosing, deploying, and using the technology. After a proof of concept and evaluation, the decision to adopt Dapr most often sits with Architects or an equivalent architecture function, wherever that resides in a company's org chart. This could be the CTO or CPO in a smaller startup or the engineering team if there's no independent architect function.

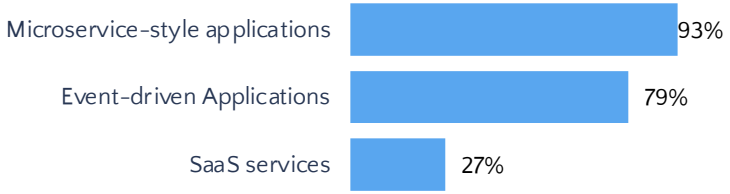
Three quarters (74%) of development teams are using Dapr for applications that are mission-critical, core to the business. The most common use cases for Dapr are microservice-style applications (93%), event-driven apps (79%), and SaaS Services (27%).

The majority of development on Dapr (65%) is greenfield, and applications being developed most often target businesses (B2B, 60%) followed by internal employees (53%) and consumers (B2C, 49%). More than a third (37%) of stakeholders have Dapr applications deployed to production, and 37% have applications in development with production deployment planned.

Three quarters (75%) of respondents run Dapr on Kubernetes. Most (62%) chose Kubernetes first then Dapr, while the remainder chose Dapr at the same time as Kubernetes (23%) or chose Dapr first and then Kubernetes (14%).

Cloud choice dictates Kubernetes choice to a large degree. Azure AKS (56%) leads the pack, but many use AWS EKS (23%) and GCP GKE (12%). Cloud-independent choices include SUSE Rancher (9%), RedHat OpenShift (2%), VMware Tanzu (1%) and others.

What type of applications or solutions is your team developing using Dapr?



Dapr is primarily being used for Greenfield development:

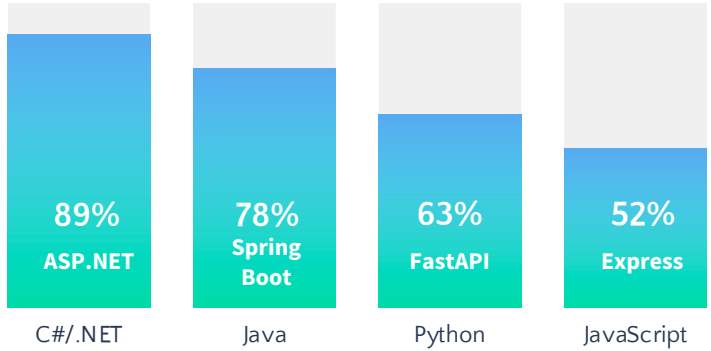
of Dapr applications are considered mission-critical

Developing With Dapr

As a polyglot, platform-independent technology, Dapr supports a wide range of options for developers. The survey data shows a majority developing locally either on Windows (47%) or WSL on Windows (Windows Subsystem for Linux, 20%) followed by MacOS (25%) and Linux (8%).

Most teams (95%) use a development framework: ASP.NET (used by 89% of C# users), Express.js (52% of JavaScript users), FastAPI (63% of Python users), Spring Boot (78% of Java users), and Gin (12% of Go users) are the most popular choices in each category.

What development framework does your team use with Dapr?



of Dapr development teams use an application framework

"Dapr helps us a lot with coding. We haven't had to spend so much time with security and writing communication protocols."

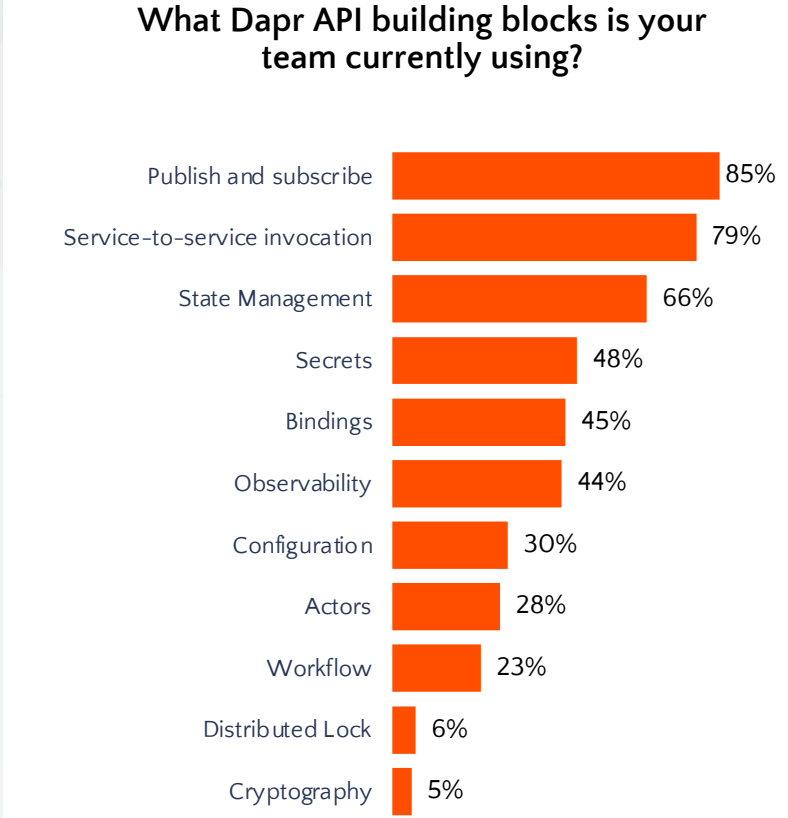
DEVELOPER, LARGE SOFTWARE COMPANY

Popular Dapr Building Blocks

Dapr API building blocks are at the heart of the project. They are easily accessible via HTTP or gRPC calls without the overhead and complexity of building dedicated libraries into your application code. Dapr building blocks provide a range of common services for storing state and other data, communicating between microservices, and—more recently—for orchestrating application workflows. Adoption of Dapr building blocks among survey participants roughly follows the order in which they were released: Asynchronous messaging using the publish and subscribe building block is the most popular, used by 85% of respondents. A close second, its synchronous cousin—service-to-service invocation—is used by 79% of respondents. Next up is State management (66%) followed by Secrets (48%). Workflow is currently used by just 23%. However, this recently released building block has garnered an enormous amount of attention and excitement with an additional 41% planning to use it in the future. See the section "Future Plans and Improvements" for details on planned future usage of building blocks.

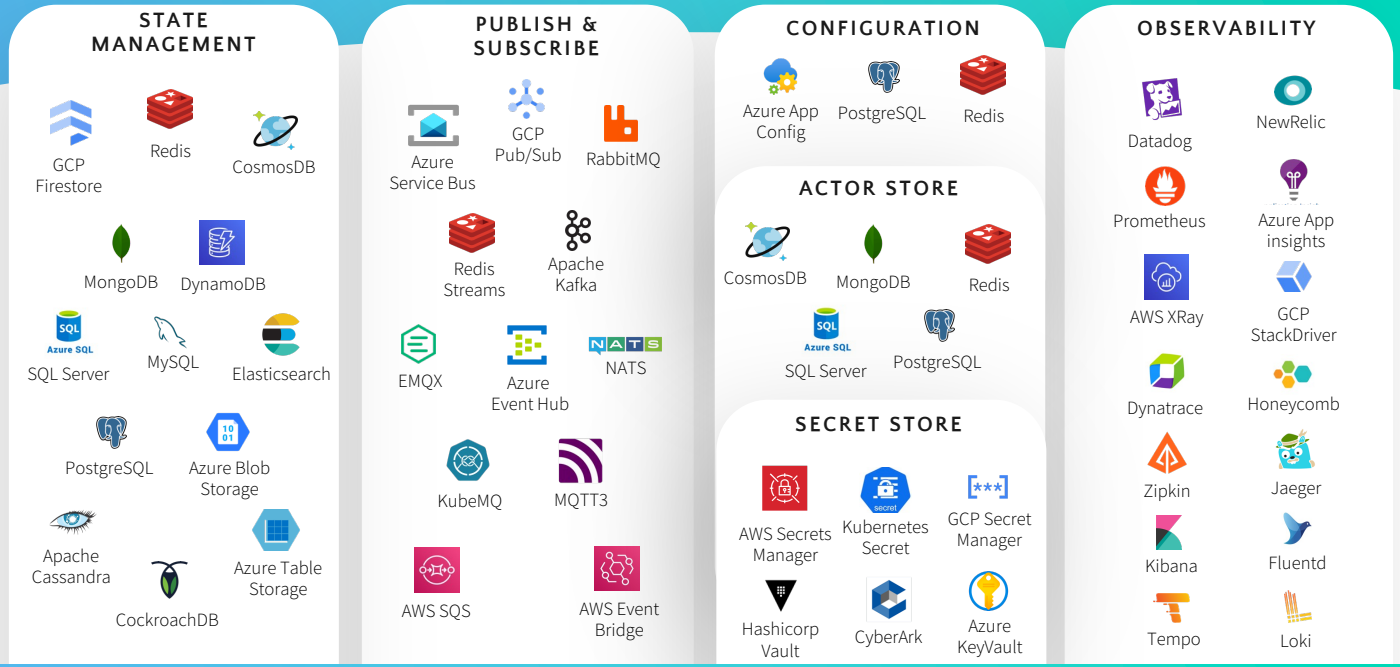
"The framework is solid and the functionality they've delivered is really working well."

DEVOPS ENGR., LARGE FINANCIAL SERVICES CO.



Flexible Infrastructure Services

The beauty of Dapr building blocks is that they decouple applications from the underlying infrastructure and developers' code gets improved portability. Platform engineers can change the service used by a building block without requiring application code modifications, or a rebuild/redeploy. For example: the publish & subscribe building block can easily be switched from Redis to Kafka or any of the other 16 supported services. Services used by survey respondents are shown here.



"There is nothing else that does everything Dapr does, and you can pick the components."

DEV MANAGER, SMALL RETAIL CO.

Dapr Delivers A Significant ROI

Incorporating Dapr into your development platform necessitates a certain level of investment for evaluation, training, and integration. However, this upfront work results in a significant return on investment (ROI) for many organizations, making it highly worthwhile.

Almost all respondents (95%) say that Dapr saves developer time, and more than half (55%) reported seeing a savings in developer time of 30% or more when using Dapr.

Most organizations would be ecstatic if new tooling yielded a 5% productivity boost; 30% is almost unheard of.

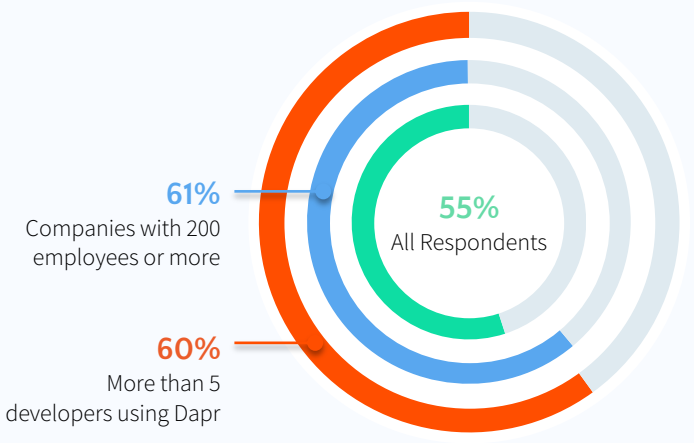
The percentage seeing this level of savings is even higher for companies with 200 employees or more (61%) or those with more than five developers using Dapr (60%).

We also asked Dapr users what they would do if Dapr wasn't available. Half (50%) would build and maintain their own middleware platform, while the remainder would use a collection of products and OSS that correspond to the Dapr API building blocks.

Dapr is definitely time saving. Our legacy code has a huge amount of process management and administration. With Dapr, our code is just business logic. I'd say that we're saving about 20% of the time spent by developers on infrastructure.

PLATFORM ENGINEER, LARGE SOFTWARE CO.

Stakeholders seeing 30% or higher savings in developer time when using Dapr



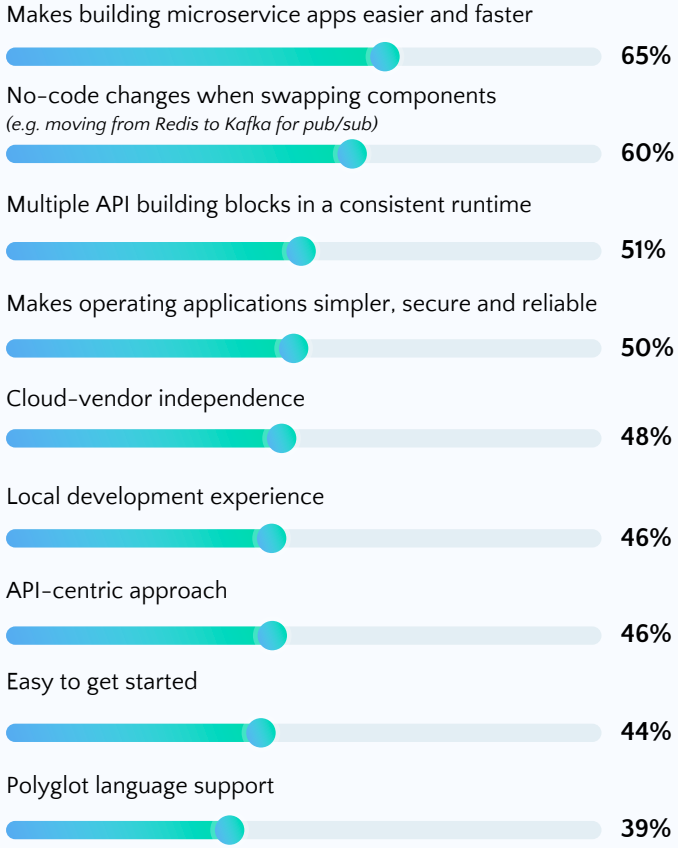
95% say Dapr saves developer time

Dapr Likes & Dislikes

Dapr users really, **really** like it. When asked to give Dapr a star rating (5 stars being the highest) 86% rated Dapr a 4 or 5, with an average rating of 4.2 stars. Among users that are expert or very knowledgeable about Dapr, 90% rate it 4 or 5 stars.

The top reason was that Dapr makes building microservice apps easier and faster (chosen by 65% of respondents) followed by no code changes when swapping components (60%). Dapr lets you change underlying infrastructure services, like replacing Redis with Kafka, without application changes.

What do you like about Dapr?



CONTINUED

Dapr Likes & Dislikes

Nevertheless, there are areas of Dapr that can be improved. More than half (53%) say debugging/troubleshooting is hard, 29% say documentation is inadequate, and a fifth (21%) report that Dapr has poor online resources for problem solving. Another fifth (19%) say it is tough to deploy to non-Kubernetes environments.

When it comes to Dapr documentation, stakeholders would like to see better sample code (73%) as well as recommendations for best practices (73%), architecture patterns (67%), and solution templates (60%).

Frankly, our whole team loves Dapr. This is the backbone of our services.

DEVELOPER, LARGE SERVICES CO.

Dapr doesn't have a lot of expense at the beginning, and there is a lot of payback.

DEVOPS ENGR. LARGE FINANCIAL SERVICES CO.

A Growing Community

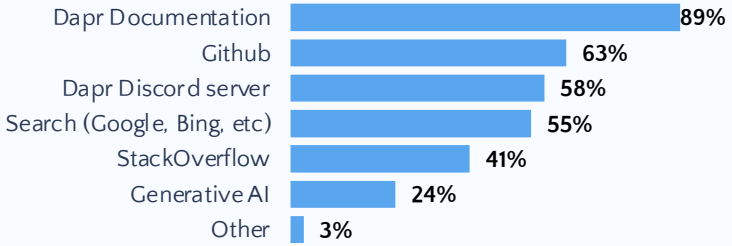
For any developer runtime, the community and resources surrounding it are critically important, and the Dapr community is thriving.

When troubleshooting a Dapr problem, the Dapr documentation was chosen as the top resource (89%), followed by GitHub (63%), the Dapr Discord server (58%), Search (55%), and Stack Overflow (41%). Generative AI is recognized as a troubleshooting resource as well, with 24% of users turning to chatbots like ChatGPT and Bing Chat for help.

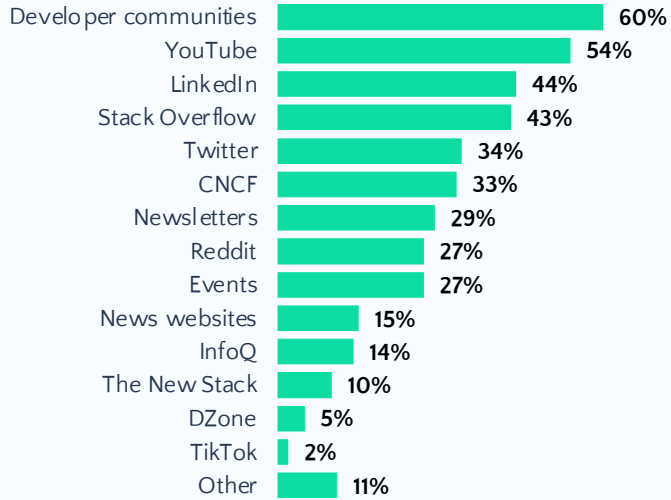
When it comes to general information on technology, the most popular source (60%) is developer communities such as the Dapr Discord server. More than half (57%) of Dapr users turn to YouTube, the channels with the most mentions include Fireship, Nick Chapsas, Dapr, Microsoft Developer, Azure Friday, CNCF, and CodeOpinion. Dapr users also rely on social media for technology information. Surprisingly, LinkedIn (44%) beats out Stack Overflow (43%), with Twitter/X trailing at 34%.

33% of users turn to the CNCF for updates. 80% of Dapr users already know that Dapr is a CNCF project, benefiting from the resources and network effect created by the cloud native ecosystem and its community.

Where do you look for information when you are troubleshooting a problem with Dapr?



How do you personally keep up to date with technology innovations?



CONTINUED

A Growing Community

Newsletters (29%), Reddit (27%), and Events (27%) also provide a rich source of technology information. Microsoft Build/Ignite, CNCF Conferences, DaprCon, AWS Re:Invent, and local meetups were often mentioned.

INFLUENCERS POPULAR AMONG DAPR USERS INCLUDE


Nick Chapsas
@nickchapsas


Bilgin Ibryam
@bibryam


Mark Fussell
@mfussell


Marc Duiker
@marcduiker


Geert Baeke
@GeertBaeke


Scott Hanselman
@shanselman


Yaron Schneider
@yaronschneider


Mark Russinovich
@markrussinovich


Mauricio Salatino
@salaboy


Thomas Vitale
@vitalethomas


Derek Comartin
@codeopinion


Kendall Roden
@KendallRoden


Cecil Phillip
@cecilphillip


Gergely Orosz
@GergelyOrosz


Ben Awad
@benawad

Future Plans & Improvements

With high levels of user satisfaction and a significant ROI, the future looks bright for Dapr.

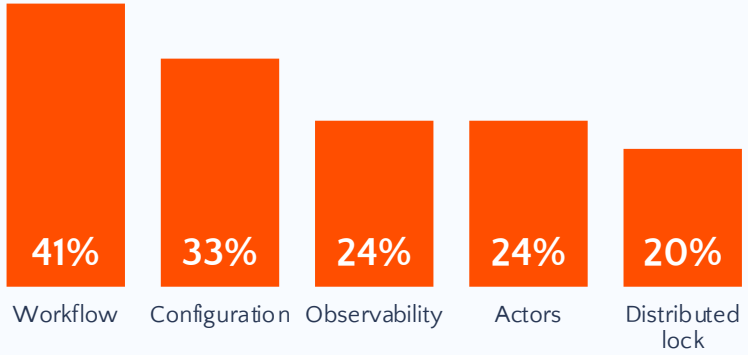
The majority of stakeholders (86%) expect to see their Dapr usage grow, and no one (0%!) plans to stop using Dapr.

Nine out of ten (91%) expect the number of new applications built using Dapr to grow in the coming year, and 85% expect to increase the number of Dapr building blocks used.

Building block expansion will be led by the new Workflow API (41% plan to implement it), followed by the Configuration (33%), Observability (24%), and Actors (24%) building blocks.

The majority of Dapr stakeholders (91%) were satisfied with the supported languages. Rust and Scala are the most requested languages by the 9% who would like to expand the current offerings.

What Dapr building blocks is your team planning to implement?



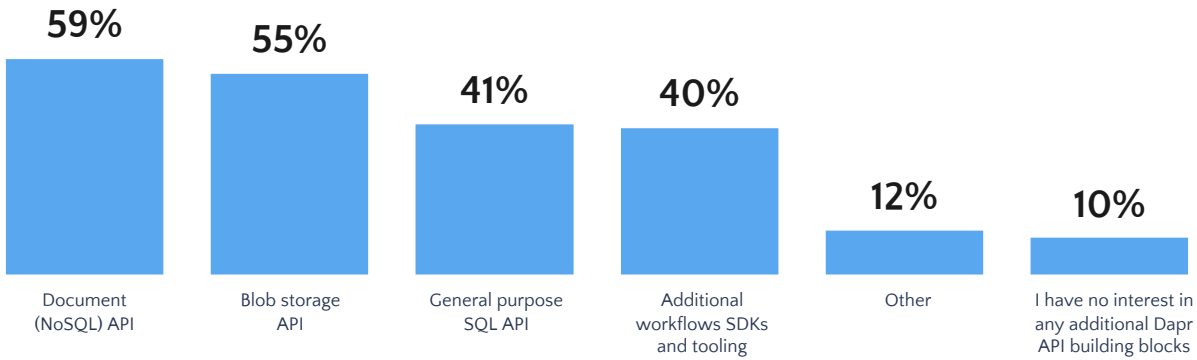
> *"Dapr is baked in now – we're pretty committed at this stage."*
> DEVELOPER, LARGE SOFTWARE CO.

CONTINUED

Future Plans & Improvements

Dapr users would love to see the range of building blocks continue to expand, with additional storage APIs dominating the popularity contest: NoSQL, Blob, and SQL.

What additional Dapr building blocks would you like to see?



"When I read about Dapr, the first thing I thought was that it made perfect sense. In a distributed world things can get crazy, so you want to have a common layer of abstraction."

ARCHITECT, MID-SIZE FINTECH COMPANY

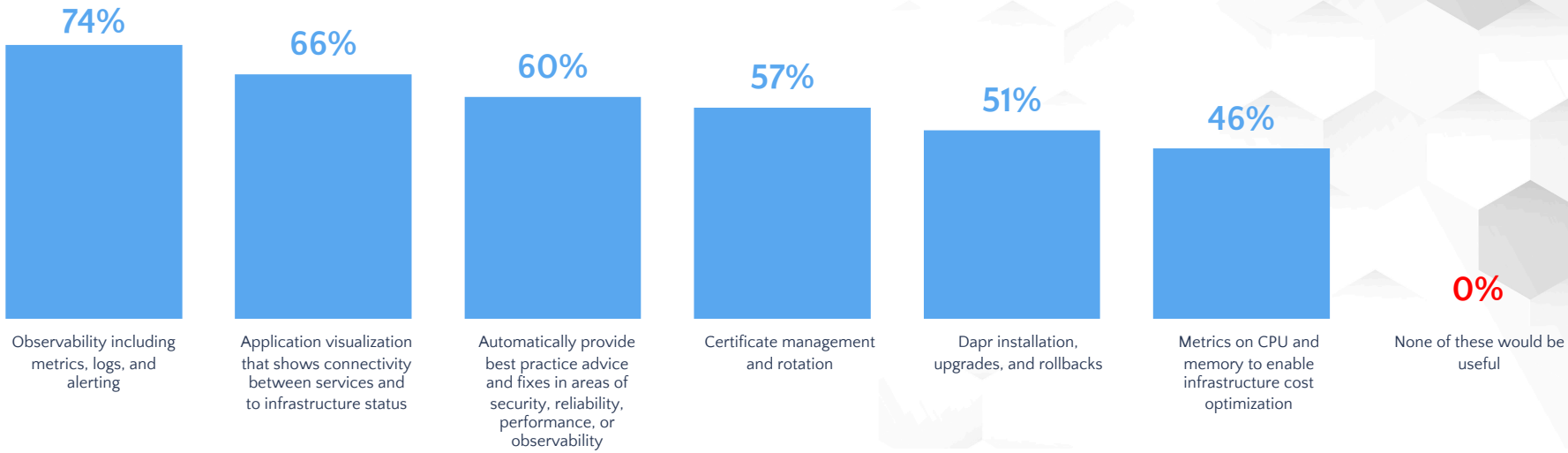
CONTINUED

Future Plans & Improvements

When asked which additional features would be most beneficial for operating Dapr, observability was chosen by 74%, followed by app visualization (66%), best practice advice (60%), and automated certificate management (57%).

> *"If you have 10 servers there is no single place to go to monitor and see all 10 servers. If you have a cluster, there is no way to monitor the cluster. We had to build our own tools so production support could monitor things."*
>
> DEVOPS ENGR, LARGE FINANCIAL SERVICES CO.

Which additional operational capabilities would be beneficial?



Summary & Recommendations

Dapr is delivering real world benefits and growing rapidly as a result. With its roots in the Microsoft community, Dapr is now spreading to a broader ecosystem of users, saving developers time regardless of cloud, language, or Kubernetes distribution.

Debugging and troubleshooting remain a challenge. Additional capabilities in the areas of observability and app visualization— as well as improvements to documentation— should make this easier in future releases.

Complementary product offerings exist for the Dapr ecosystem that can help in these areas as well.

While the Publish and subscribe building block is a strong favorite that has been adopted by most Dapr users, the new Workflow building block is driving huge excitement.

A thriving Dapr community is a significant reason for the success of the platform. The community continues to grow and welcome new users, helping them overcome obstacles and get productive as quickly as possible.

No matter where you are in your Dapr journey, its growing ecosystem, rich resources, and thriving community will help you take the next step in building distributed applications faster.

The Dapr Project **Diagrid Website**

> *"Some of the other building blocks are very compelling. The team is particularly interested in Workflow. But it's pretty new so we'll wait a bit to get our hands in."*
>
> DEVOPS ENGR., LARGE FINANCIAL SERVICES CO.

> *"It's amazing how much you can reduce TCO if you have an architecture built for that."*
>
> ARCHITECT, MID-SIZE FINTECH CO.

> *"Dapr fits into the cloud-native building blocks you need to create durable, resilient cloud-based software."*
>
> ARCHITECT, MID-SIZE FINTECH CO.

State of Dapr 2023

Diagrid boosts developer productivity by providing tools and APIs for building and operating cloud native applications. Founded by the creators of the open source Dapr project, Diagrid's Conductor service helps organizations to confidently and efficiently operate Dapr applications in production on Kubernetes. Conductor is the first offering from Diagrid Cloud, a growing portfolio of API-based developer services.

Diagrid.io

Dimensional Research® provides practical market research to help technology companies make their customers more successful. Our researchers are experts in the people, processes, and technology of corporate IT. We understand how technology organizations operate to meet the needs of their business stakeholders. We partner with our clients to deliver actionable information that reduces risks, increases customer satisfaction, and grows the business.

Dimensionalresearch.com