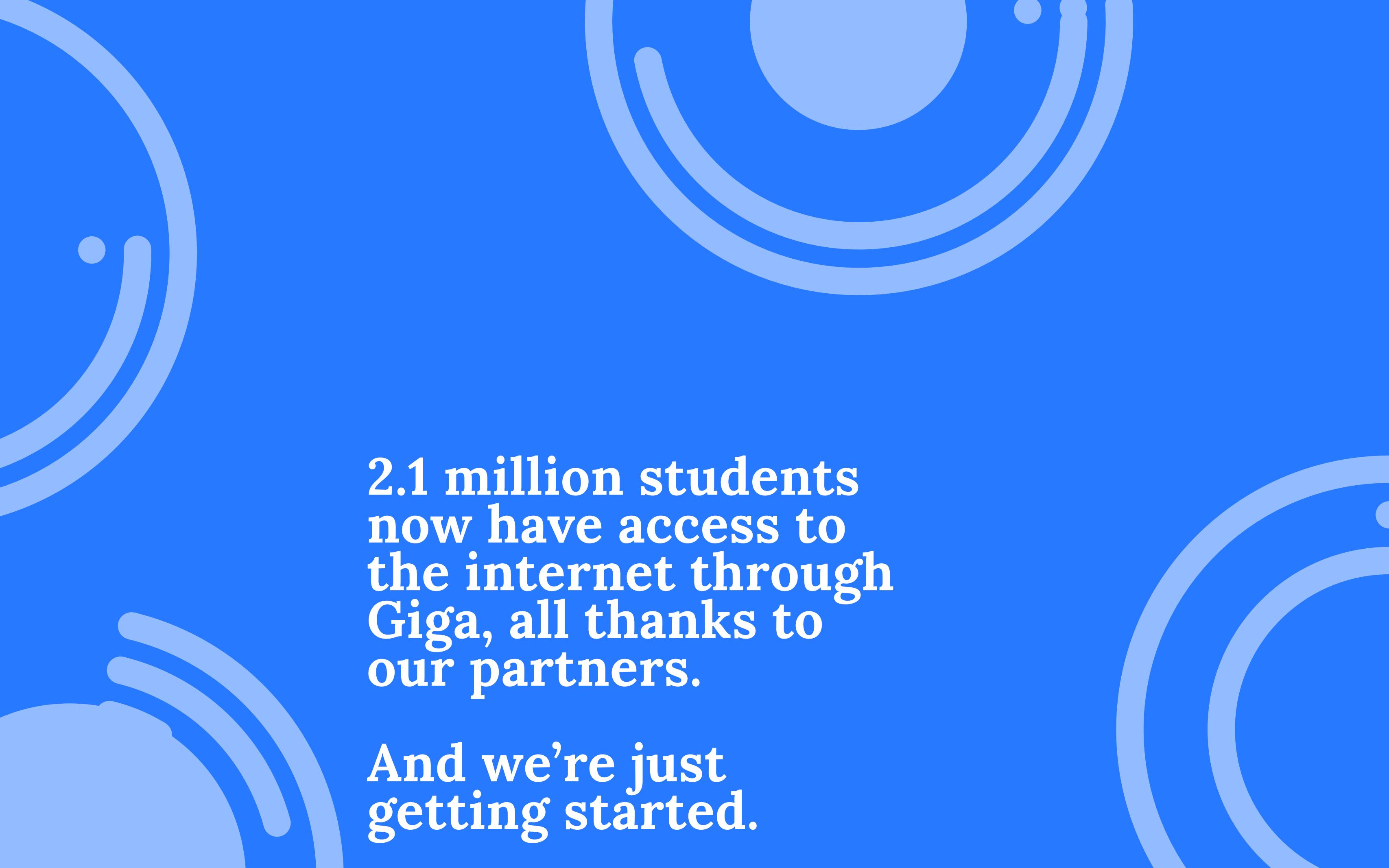


# Giga

2022  
PARTNER  
REPORT





**2.1 million students  
now have access to  
the internet through  
Giga, all thanks to  
our partners.**

**And we're just  
getting started.**

# Giga's ambition to connect 1.3 billion children to the rest of the world is undoubtedly ambitious.

But connectivity should not be reserved for the privileged. In fact, it is a critical pathway to help children secure the future of their dreams. Connectivity unlocks opportunities for children to see the world outside their community, learn in a manner that is engaging and relevant, acquire skills to be part of a competitive future workforce, and open their imagination. In a world mired with inequality and exclusion, connectivity is a powerful way to bridge the divide, not just because of what children can do with digital tools, but because digital skills can be translated to real, life-changing opportunities.

Connectivity thus becomes a uniting goal, that is beyond UNICEF and ITU alone. It becomes a matter for private sector partners, governments, and communities alike, each mobilizing to fulfill their role in securing children's future through bridging the digital divide.

This report tells the story of Giga's work, enabled by partners who are not just duty-bound but invested and excited to innovate and deliver connectivity-enabling solutions shoulder-to-shoulder with the Giga team.

We hope that you enjoy reading about how we figure out and put together the puzzle of connecting all the schools in the world. From working with an artist to create and then auction Non-Fungible Tokens (NFT's) to using staking in blockchain to experiment on new models of financing, the lengths that Giga's team will go to in its quest to innovate is limitless.

From the gorges of Kyrgyzstan to the mountains of Rwanda, Giga's mission resonates with the most elemental human need: to be connected to the world around us. We hope you are inspired to partner with us, to share your ideas, and invest your resources. Giga's capability relies on these ideas, and your commitment to bring connectivity to life for millions of children around the world.



# Thank you to our partners

As our work to map, finance, and connect schools progresses, it is the effort and investment of partners that make the journey of achieving the goal to connect 1.3 billion schools possible. Giga's achievements have been made thanks to the commitment of partners we've worked with in the past year. Partners have helped Giga connect millions of children to the internet, providing them with information, opportunity, and choice. As we look forward to 2023 and beyond, we owe a debt of gratitude to everyone who has journeyed with us thus far.

Thank you to our core partners, Ericsson, Musk Foundation, IHS Towers, Dubai Cares, and Dell Technologies, whose support has accelerated Giga's capabilities and impact tremendously. Our future progress relies on expanding partnerships like yours and advancing collaborative activities that delivering impact to our mapping, financing, and connecting work. Partners ground truth our ideas, challenge us to experiment, and help us adopt an agile approach that embraces lessons to improve our understanding of what it takes to connect schools around the world. We look forward to building more partnerships like these to scale Giga's geographical footprint and operations globally to connect all schools to the internet by 2030.

On behalf of the young people who continue to benefit from Giga, UNICEF and ITU offer deep gratitude for the generous support provided by our partners. Together, we will continue to progress Giga's important work to address data inequity and lack of access to technical resources necessary to bring sustainable internet connectivity to every school in the world.



MUSK FOUNDATION



LIQUID  
INTELLIGENT TECHNOLOGIES

Actual

nic.br egibr



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**19**  
**partner**  
**countries**  
have  
joined us.

We have helped  
**mobilize \$243.3M**  
**funds** in countries  
towards accelerating  
connectivity.

Through Project  
Connect, we have  
**mapped 1.1M schools**  
in **50 countries**,  
of which **63K are**  
**reporting** real-time  
connectivity data.

We have  
**connected**  
**5.5K schools**  
and more than  
**2.1M students &**  
**teachers.**

# Universal connectivity remains elusive.

Connectivity is the foundational layer needed to transform education. Around the world, 1.3 billion (67%) of school-aged children lack access to the internet at home and while some students find the opportunity to access connectivity at school, out of 1.1 million schools mapped on the Project Connect platform, only 55% of schools were connected to the internet.

The recent global crisis, the COVID-19 pandemic, proved that connectivity is essential. Yet, increasing access to connectivity faces many obstacles. These include gaps in data about the status and quality of connectivity, the proximity of connectivity infrastructure, national policy and regulatory constraints, high capital investment needed to extend critical connectivity infrastructure in hard-to-reach areas, and fragmentation in funding and coordination mechanisms.

Schools serve as an entry point for increasing access to quality connectivity for young people, thus transforming education and opportunities created by increased access to information. It is on this premise that Giga originates. Giga is a joint UNICEF-ITU global initiative to connect every school to the Internet and every young person to information, opportunity, and choice.

Giga frames its work around three pillars that are fundamental to ensuring every young person is connected to the internet: map, finance, and connect. It is estimated that there are approximately 6 to 7 million

schools in the world. However, the actual number remains unknown, as well as the status and quality of connectivity in these schools. To address this, Giga maps school locations, Internet access, and proximity to connectivity infrastructure on Project Connect<sup>1</sup>. The platform also provides real-time display of access and needs to inform funders and governments and enable accountability. Giga also creates models through innovative financing to mobilize resources for connectivity. Giga's aim is to mobilize \$5 billion to catalyze investment in connectivity infrastructure. Lastly, Giga helps governments design the regulatory frameworks and competitive procurement processes that are foundational to identifying and clarifying connectivity costs and processes.

This report showcases the progress Giga and partners have made in 2022, as we work towards meeting our ambitious goal to connect every school to the internet in the next eight years.

**INTRODUCTION**

# The Giga Team

One of the essential ingredients that makes Giga work is its diverse team. The team comprises approximately 44 self-identified nerds who take great pleasure in moving the needle forward in the direction of impact for children around the world. Giga's team stitches together groundbreaking innovations that create the bedrock of confidence that our ambition to connect 1.3 billion children to the internet is achievable.

The team come from 35 different countries, and have extensive expertise in data science, investment banking, foreign policy, telecom infrastructure, international development, software engineering, technology implementation, venture capital investing, partnerships, program management, communications, and graphic design. The essence of Giga is to attract talent that wants to work on a 'gigantic' goal that can create tangible, life changing impact in the lives of children.

As of this year, Giga is setting up the Giga Technology Centre in Barcelona<sup>2</sup>, as well as the Giga Headquarters in Geneva. The Centre will lead on experimenting and creating new connectivity solutions through blockchain, satellite imagery analysis, and AI technologies. It will act as a force multiplier for Giga's work, facilitating cross-sector collaboration between Giga, technology companies, and the public sector. The Centre also provides Giga with technological, financial, and political capital as Giga scales globally, positioning Giga as the preeminent global resource for open-source technologies required to sustainably connect all schools to the internet.

## WHERE WE WORK

19 priority countries have joined Giga in the commitment to connect every school in their country by 2030 and an additional 35 countries are implementing the Giga model at varying capacities. While these successes have marked a great journey for Giga, the goal to reach 1.3 billion children is one that requires concerted investments from partners who have a stake and commitment to seeing it through.

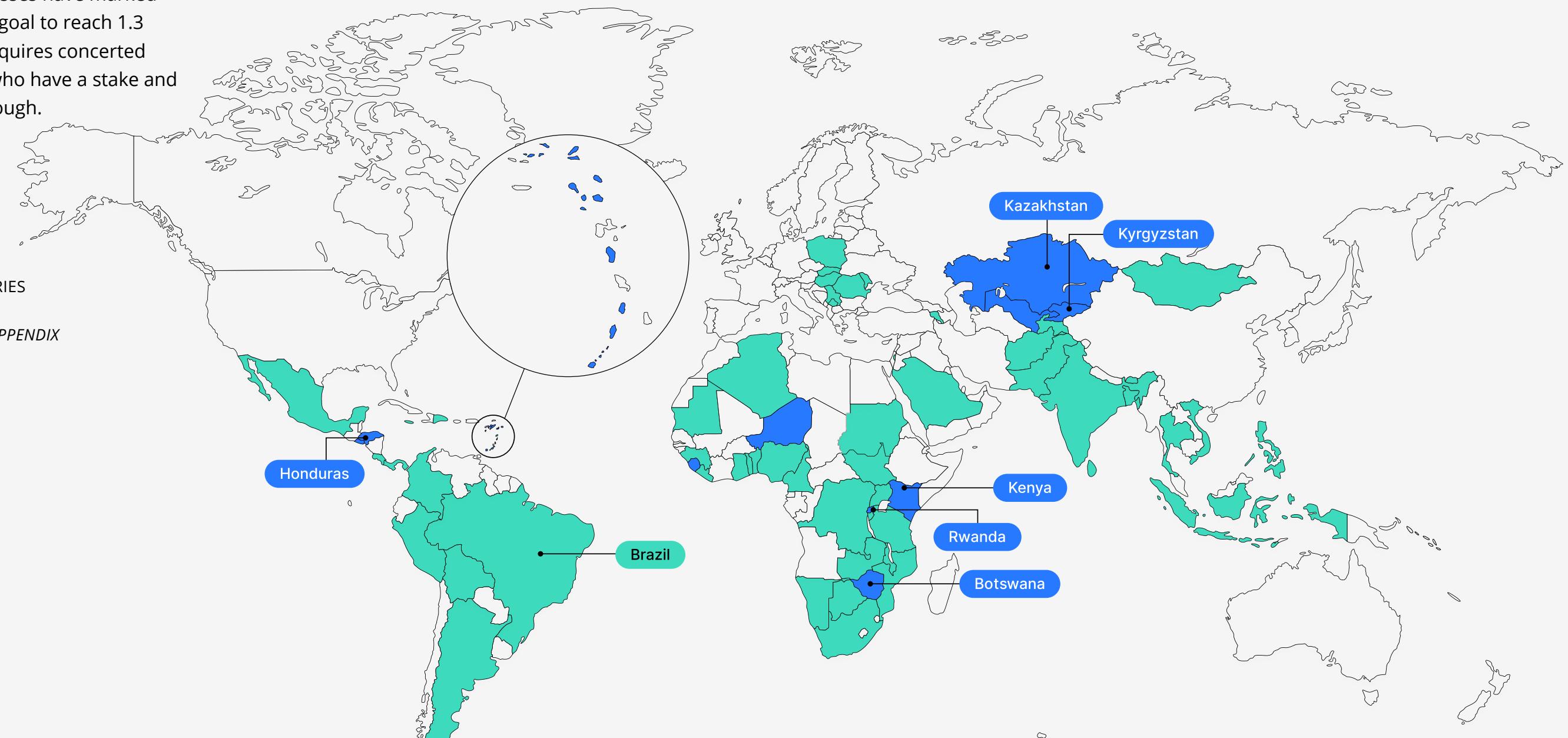
- PARTNER COUNTRIES
- PROJECT CONNECT COUNTRIES

FIND FULL LIST OF COUNTRIES IN APPENDIX

In **Honduras**, 24 schools are connected through fiber optic, reaching 10,000 children, and the communities surrounding the schools now have wi-fi hotspots and mesh networks.

Giga helped **Kazakhstan** and **Kyrgyzstan** to accelerate achieving universal connectivity with over 98% of schools already connected.

Giga supported **Kenya** with last mile connectivity solutions, enabling over 400,000 students and teachers to get online.



## INTRODUCTION

# Where We Work

In **Brazil**, Giga, in collaboration with the government of Brazil, NIC.br and UNICEF Brazil, connected more than 45,000 schools which are now also reporting daily live connectivity status.

In **Botswana**, Giga helped the government to roll out connectivity to 633 schools, creating access for 240,000 students and teachers.

In **Rwanda**, Ethereum and Giga are experimenting with staking crypto currency as a form of financing that has the potential to afford schools with the necessary connectivity costs.

## Map

### 1 – Building infrastructure and processes for future scale

Since reaching the milestone of mapping the first 1 million schools in just 2 years, our technical team has been working relentlessly to improve the quality and reach of our mapping, while optimising models and processes to achieve sustainability at scale.

To map school locations at scale, our Data Science team has developed new AI models and algorithms that are tailored to local contexts and generate more precise school location predictions. We have successfully developed operational algorithms in 9 countries so far, including in Sudan, where, in collaboration with the Sudan UNICEF Country Office, the team analysed 1.2 million high-resolution image tiles to identify over 20,000 schools in the country, with an overall validation rate of 90%+. Building on this success, the team is planning to build a global database of ‘seed’ training samples, allowing Giga to train tailored AI models for an estimated 40 countries across 6 continents.

Giga is also developing Application Programming Interfaces (APIs) to ingest data from Internet Service Providers (ISPs), allowing us to expand the set of specific data sources incorporated into our open-source platform, while ensuring data quality and validity.

With these AI models and optimised data processes, Giga aims to double the number of schools mapped on the Project Connect platform, to 2 million+ schools in the next few months.

In addition to scaling our mapping capabilities, the technical team has been working to optimise our approach for working with data and with Country Offices. Given how varied source data can be,

depending on country context and data availability, Giga has seen an increased need to develop better processes for operating at scale and with dozens of Country Offices. Giga has successfully streamlined the validation process of data with country teams, with the goal of transitioning towards a model where country teams own and manage their country's data as local experts.

### 2 – Maximising impact with in-depth mapping capabilities

Apart from expanding the scale of Giga’s open-source school maps, we have also been focused on maximising the impact of these maps for various stakeholders by increasing the granularity of maps expanding the scope.

By increasing the variety of data incorporated in our school maps, Giga generates a more granular view of connectivity and builds models that inform connectivity scenarios for costing. In Rwanda, Giga utilized different layers of data to develop an interactive infrastructure map, integrating all primary and secondary schools in Rwanda. The map provides an insight into the connectivity options available to schools, supporting modelling analysis to identify the most cost-effective way of delivering connectivity. The map displays granular data (i.e., separately for each school), as well as data aggregated over administrative regions, such as the distance from schools to existing fiber optic points, aggregated data on unconnected schools, their distance to electric grid, and CAPEX estimates for connectivity scenarios. This allows for greater levels of visibility into costs for governments and connectivity providers, unlocking cost efficiencies through effective optimisation and enabling more robust business cases for connectivity.

## INTRODUCTION

# How We Work

Giga is also expanding the scope of what is mapped. In the 2+ years of mapping school connectivity, Giga has learnt that schools aren't the only key buildings and features to understand when building out connectivity networks – where other important buildings are located in the community is also crucial. The team is thus expanding Giga's mapping to key features and locations (e.g., mobile towers, buildings etc.), by adapting existing AI algorithms to identify and locate surrounding infrastructure, such as mobile towers, hospitals, government buildings, and other key landmarks. This is vital to help Giga and governments make better choices about what and where to finance particular connectivity technologies, resulting in optimized planning for school infrastructure – potentially reducing CAPEX costs by ~10-40% based on the proximity of health centres and schools. By identifying key infrastructure beyond schools, Giga is also building a global storehouse of information in the public domain for new connectivity providers to use, as they work to optimize delivery to the most vulnerable populations.

## Finance

Connectivity requires thoughtful project planning and creative financing solutions. Giga utilizes grant funds, private capital, development loans, loan guarantees, and other financing mechanisms to support school connectivity. There are four main financing modalities that Giga seeks to apply and utilize on the quest to connect all schools by 2030.

### **1 – Programmatic scaling of pilots**

By way of Giga's Accelerate pilot program, Giga has long-term agreements with local operators and implementation partners that are available to scale up their work.

### **2 – Project-level financing**

Many Giga partner countries do not have access to traditional financial instruments. In those instances, a guarantee may be used to facilitate or lower the cost of public funding components in public-private partnership ("PPP") transactions.

### **3 – Outcome-based solutions**

Giga's connectivity projects produce verifiable and quantifiable impact that can underpin a variety of financing tools and help borrowers qualify for concessional terms.

### **4 – Non-traditional capital mobilization**

Giga has helped countries execute PPPs that make capital available for school connectivity and transfer risk to the private sector.

## ● Connect

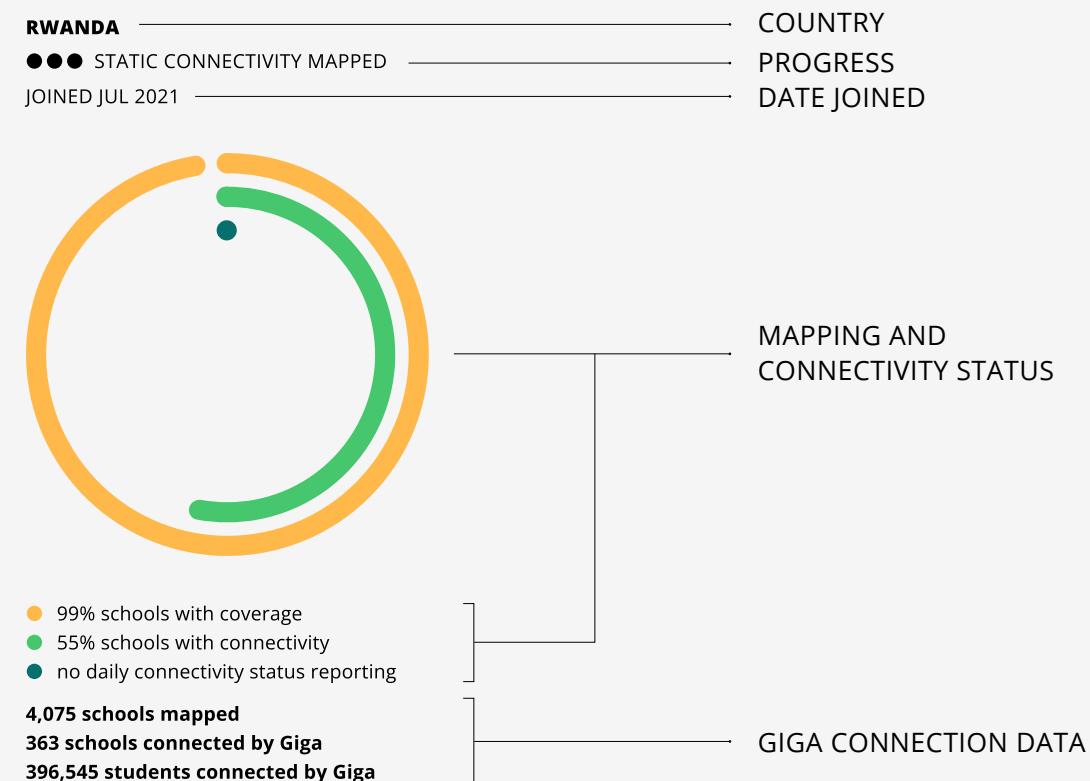
Giga has been working with government partners to explore the different technologies, operating arrangements, and business models to connect schools sustainably to the internet; as well as assessing the policy, regulatory and market conditions of the ICT sectors in different countries.

Since 2019 and in collaboration with 19 partner governments, Giga has connected over 5,500 schools and over 2 million students. Giga has identified the technical and financial challenges to bring last mile connectivity, especially to the most remote and rural schools, but also has assessed the positive impact that connectivity brings to learners and to the schools' surrounding communities, in terms of access to information and improved economic opportunities. Giga has launched 13+ competitive bidding processes in Eastern and Western Africa, Central America, and Asia to connect schools through global and national internet service providers. This work has helped Giga to vet the providers' capacity to deliver infrastructure, equipment, and connectivity services, as well as to develop the market shaping strategies and establish the Long-Term Arrangements (LTAs) that will support Giga's role as an advisor to countries for large-scale procurement.

As a result, from policy and regulatory assessments, Giga delivers actionable recommendations to policymakers to ease market access for broadband deployment and attract and sustain public and private investment in school connectivity. This is the case of the Universal Service Fund (USF) toolkit, which provides fund administrators with practical tools that can help improve the efficiency of this instrument to finance school connectivity.

### *How to Read this Document*

We present our annual report in the form of case studies. Each time a country is mentioned, an accompanying chart will appear on the left, displaying key metrics – mapping, coverage, and connectivity data. The fuller and more colourful a chart is, the more we have achieved in that country.



**CASE STUDIES**

# Map

## **Project Connect Daily Check App in Partnership with Ericsson**

Understanding the real quality of service that schools receive has always been an important challenge for Giga. Having access to this data allows for better accountability of service providers and opportunities to improve the quality of internet experienced by students and teachers. So far, the Project Connect platform hosts real-time connectivity data for over 60,000 schools in 9 countries. This includes over 45,000 schools reporting daily QoS data through an App developed by NIC.br in Brazil and 80% of connected schools in Freetown, Sierra Leone reporting QoS data through an mLab extension.

To expand data acquisition and the accessibility and efficiency in the collection of this data, a joint tech team between Giga and Ericsson was set up with the goal of building a minimum viable product (MVP) for what is called the Daily Check App, an application that schools can install to report quality of service data to Giga.

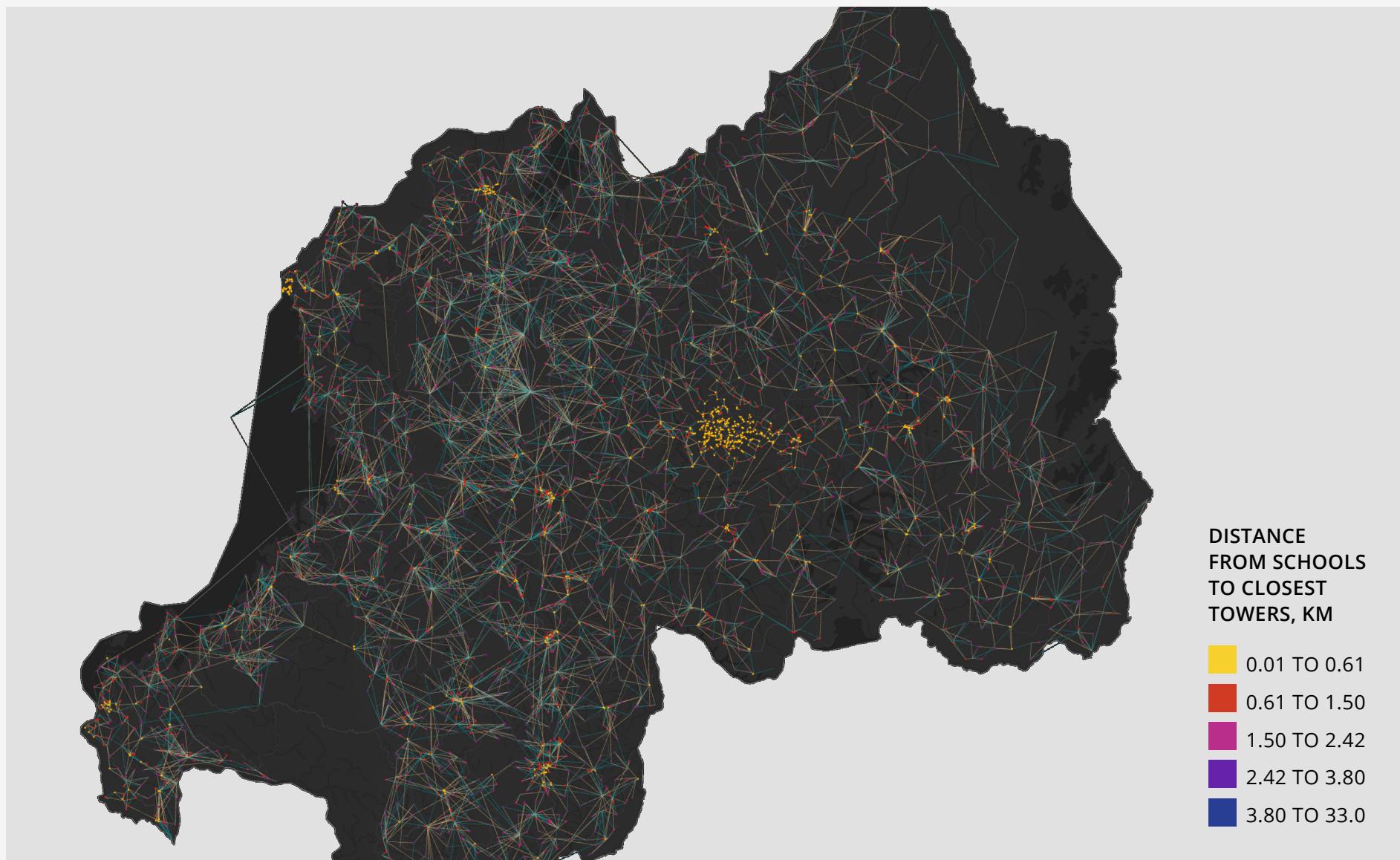
This collaboration was the first of its kind for Giga. Ericsson's team worked shoulder-to-shoulder with Giga, allowing for a collaboration between the two organizations that truly operated like a single team. This year, the team collaborated on the scoping, design, and execution of this MVP with the goal of creating a functional application to test in the field by the end of the second quarter of the year. It's worth emphasizing that Ericsson provided a full team of developers for this project, an exemplary form of in-kind contribution that helped accelerate the delivery of the product.

After months of detailed work between the teams, the first roll out of the Daily Check App started in July 2022. By the end of September, the Daily Check App has been piloted in six schools, with plans for larger-scale rollout in the future.

## Mapping in Partnership with IHS Towers

IHS Towers has provided Giga with critical data to support the school mapping work and development of infrastructure maps. This comprehensive data was shared with the Giga team for 5 countries, namely Cameroon, Côte d'Ivoire, Nigeria, Rwanda, and Zambia.

This data has been an input for Giga infrastructure maps and analyses, which provide key insights on the most efficient and effective technologies



SCHOOL VISIBILITY ANALYSIS MAP IN RWANDA

to connect schools to the internet. They are used to inform and support governments and other stakeholders' decision-making processes throughout the lifecycle of a school connectivity project, from project planning and design to technology selection and project delivery.

In Rwanda, the Giga team has used data from IHS Towers to perform tower to school visibility analysis, which will help to identify the most suitable towers to connect schools.

Findings from the analysis include:

- Average distance from a school to the closest tower is 2.5 km. The distance between schools and towers can be used to determine transmission power and link resilience.
- Over 98 % of schools are visible from at least one tower, while 95 % are visible from two towers and 91 % from 3 towers.
- Overall, Rwanda is well covered with tower infrastructure. Only less than 2% of schools are not visible from towers.

Giga is also planning to use the IHS Towers data with satellite imagery to train a model that can fill gaps in infrastructure data globally. This together with the visibility analysis will improve the accuracy and efficiency of Giga's cost modelling, help governments to determine optimal technology, policy and procurement solutions, and ultimately support the development of sustainable business models for connecting schools.

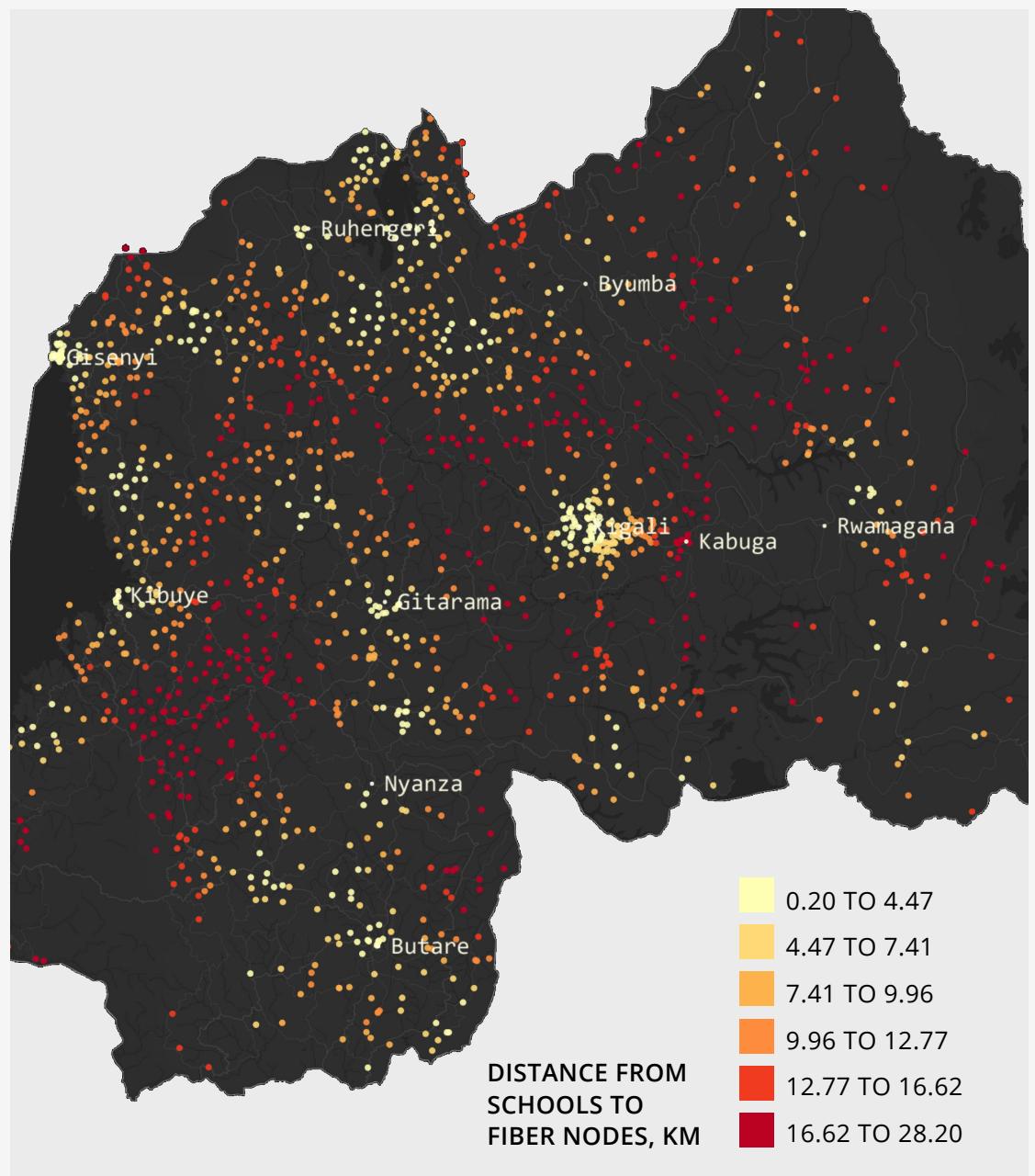
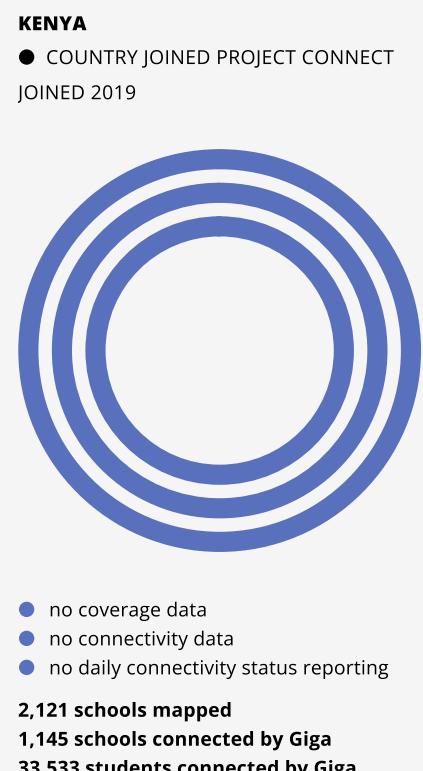
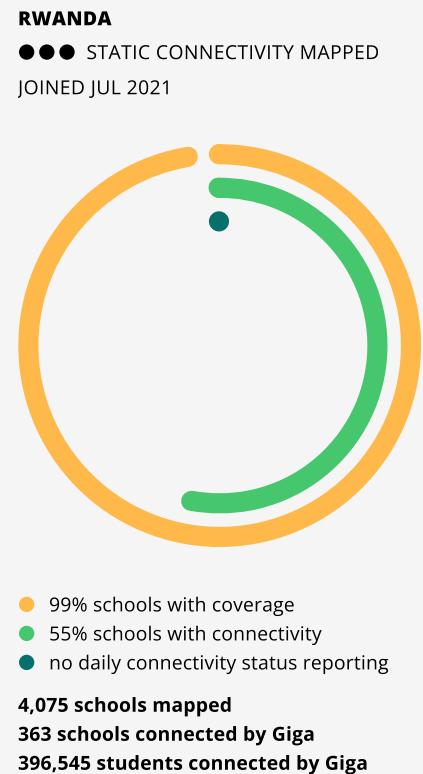
## Maximising impact through developing in-depth mapping capabilities in Rwanda and Kenya

Giga has been focused on maximizing the impact of these maps for various stakeholders, providing valuable information to national governments, connectivity providers, and businesses as they implement national-level connectivity initiatives and projects. By increasing granularity of maps and carrying out in-depth mapping in 23 countries, Giga has allowed for greater levels of visibility into costs for governments and connectivity providers. Giga developed an interactive infrastructure map, integrating all primary and secondary schools in Rwanda by utilizing different layers of data. The map provides insight into the connectivity options available to schools and supports modelling analysis to identify the most cost-effective way of delivering connectivity. It displays granular data, for each school, and the data aggregated over administrative regions. The data includes the distance from schools to existing fiber optic points, mobile coverage areas, aggregated data on unconnected schools, their distance to electric grid and rough fiber networks, and CapEx estimates for scenarios when all schools are connected to fiber.

The granular geolocated data has been difficult to obtain and consequently maps may underestimate some of the schools' existing connectivity infrastructure. Nevertheless, these maps still allow Giga and partners to differentiate schools and regions by the risk of being unconnected. With the data available Giga has also identified gaps in infrastructure and connectivity, and in areas where data is difficult to obtain, Giga classifies these areas as schools and regions at risk of not being connected.

Giga delivered a training session on how to use and update the interactive infrastructure maps to technical experts from the Government of Rwanda. The session aimed to deepen the understanding of the interactive infrastructure map, its functionality, and data use. Participants expressed their continuous support to Giga by sharing more granular data to identify sustainable financing models to connect schools.

A similar exercise was carried out in Kenya, where Giga supported infrastructure/connectivity gaps analysis and interactive connectivity map development. The Giga Kenya team collected data on school location, infrastructure, and connectivity, then created an interactive map for Kenya. The map, which is constantly being updated, can help government, investors, and network providers visualize broadband gaps, allowing them to make quicker and more precise decisions, such as developing ICT infrastructure to connect new and existing schools.



IHS Towers has provided Giga with critical infrastructure data to **support school mapping work and the development of infrastructure maps**

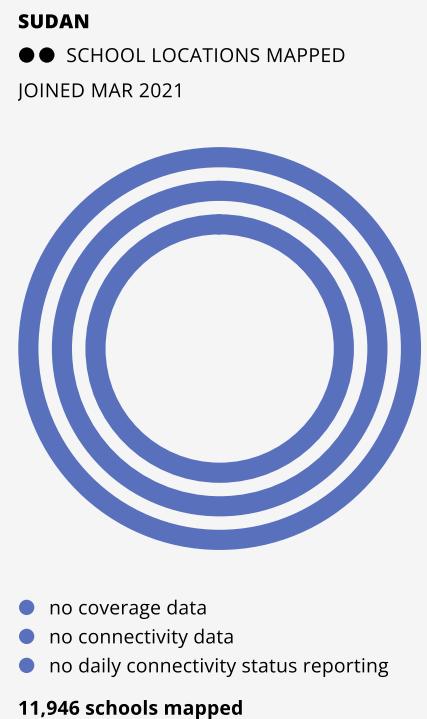


## Using A.I. to Map 20,000 Schools in Sudan with Dell

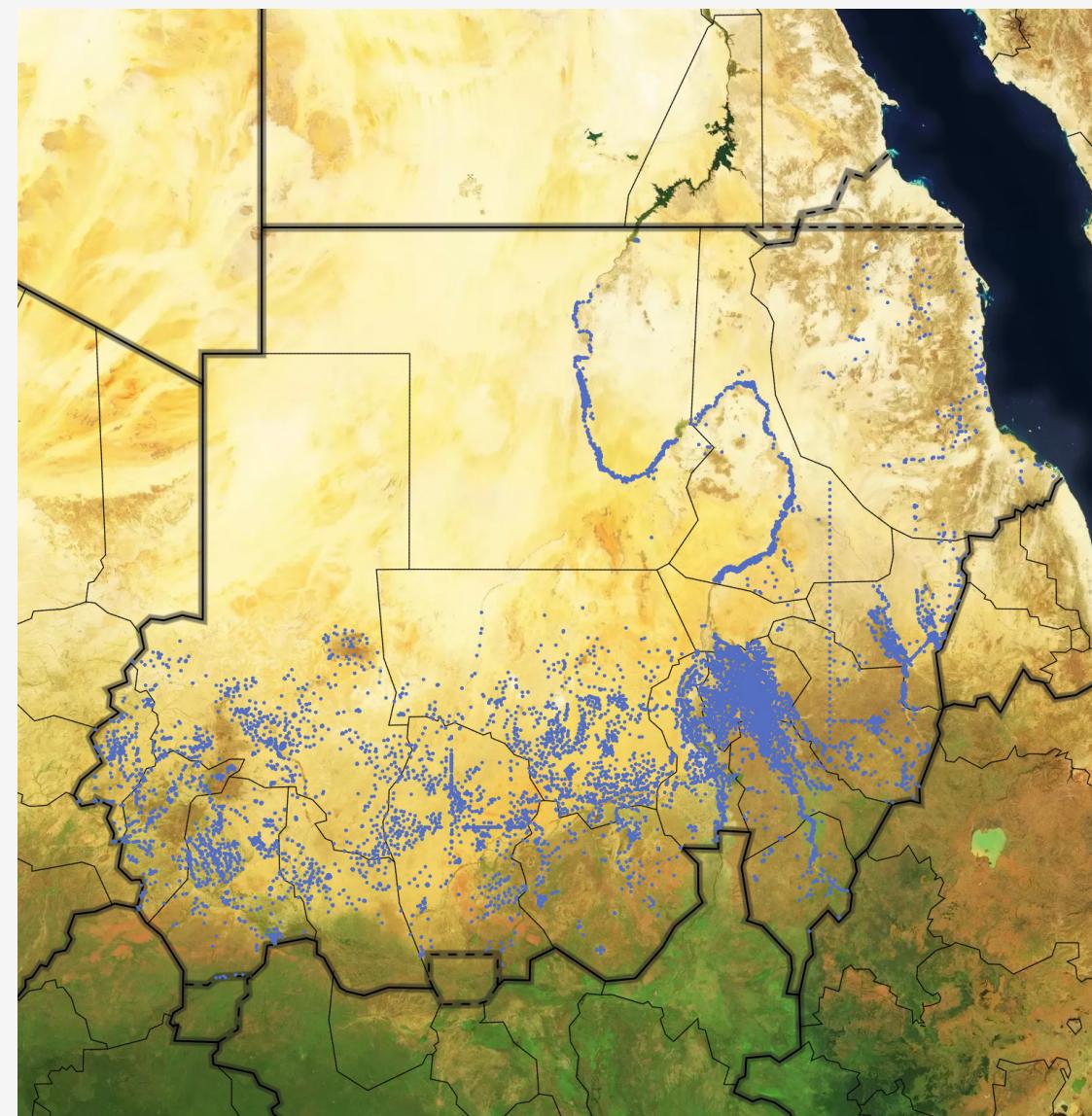
Giga has been developing new AI models and algorithms for analysing and detecting school locations, which are tailored to local contexts, enabling the provision of increasingly precise school locations and information. We have successfully developed operational AI algorithms in 9 countries so far, including in Sudan. Many children in Sudan are not able to enjoy the benefits of online learning as school connectivity levels are very low. Moreover, the country has limited and unconsolidated information on more than 50% of public schools. Mapping can help address connectivity gaps by providing accurate datasets of school locations for insights for the planning and roll-out of connectivity infrastructure across Sudan.

Given the geography and population of the country, relying on conventional methods of collecting this data would be cost and time intensive, especially for schools in hard-to-reach areas. Thus, more innovative approaches are needed. Towards this, Giga developed an innovative model to identify school locations using A.I. and satellite imagery. The trained model has now been applied on over 1.2 million satellite image tiles, covering the entire settlement area in Sudan, resulting in the mapping of over 20,000 schools across the country with a 90% accuracy rate, a high rate for this type of model.

In terms of process to achieve this, 52 volunteers from Omdena were given a geo-diverse, high-resolution satellite image of Sudan and some school location data points. They then trained the AI how to distinguish between schools and other types of buildings, implementing an object detection model which uses polygons marked around school buildings from high-resolution satellite imagery as training samples. Giga also received assistance from partner Dell Technologies with their High-Performance Computing (HPC) environment, greatly reducing time for downloading, processing, and applying models on satellite imagery tiles, from the expected completion time of 1 year to 6 weeks—a 9x increase in efficiency.



Building on the pioneering work in Sudan, Giga intends to improve and implement a similar approach to mapping schools in an estimated 40 countries in 6 continents as well as optimizing existing AI algorithm workflows through semi-/self-supervision machine learning approaches, coupled with Human-in-the-loop modules for maximum efficiency.



## Connectivity Credits

Part of what widens the connectivity gap is the high costs for connecting the hardest-to-reach areas. These areas are characterized by limited infrastructure for both connectivity and electricity and therefore the incentives or business case for the high cost for expanding the infrastructure needed to connect the hardest-to-reach schools and students becomes a challenge. This furthers the digital divide, relegating the most vulnerable to the fringes of digital inequality.

There must be a compelling business case to connect marginalized schools. This is a welcome opportunity to innovate. Connectivity credits can be a solution to ensure the hardest-to-connect are not left behind. Like carbon credits, connectivity credits can create a marketplace that incentivizes providers to connect more remote, less profitable schools and ensure that every school is connected to the internet. Specifically based on government priorities, schools that are hardest-to-connect in poor, or rural areas, or schools that target serving the most vulnerable like girls and children with disabilities, could be a basis for granting credits for which internet service providers could garner as they expand connectivity to these areas and schools.

In some cases, once these hard-to-reach schools are connected, due to their remoteness and cost to physically monitor in these areas, it is difficult to monitor the stats and quality of the internet. Thus, Giga aims to link this concept to the already ongoing work to monitor school connectivity in real-time via Project Connect.

Given the intricacies to test this model, governments are key partners needed for this to work. Aligning connectivity credits to already existing tax policies and spectrum licenses, could allow for fiscally sound subsidies and tax breaks as rewards for connecting schools that are difficult to connect. This would also further benefit surrounding communities as the schools could operate as hubs and connect the service providers to wider range of consumers, thus working towards creating innovative incentives and a more attractive business case for providers.

Giga is currently working with Botswana to develop a proof-of-concept model for connectivity credits. The current focus is on engaging relevant stakeholders and gathering inputs that will turn the concept into a practical tool that will make connecting remote schools, typically overlooked by more profitable internet providers.

**CASE STUDIES**

# Finance

## Using a Spectrum Auction to Achieve Universal School Connectivity: A Best Practice in Brazil

Radio frequency spectrum is a finite public resource that has a wide range of use cases for wireless communications providers and other actors. National auctions have become the primary means of assigning spectrum licenses, which give companies the exclusive right to use a frequency band for a particular application. A well-designed auction will assign spectrum to those who value it most, incentivizing auction winners to use the spectrum efficiently through investment in high-quality mobile networks. Auctions also generate substantial state revenues as winners are required to pay upfront or annual fees. As such, auctions can also be used as a tool to fund school connectivity.

Such is the case in Brazil where the entirety of the country's 5G auction proceeds were earmarked for reinvestment in the country's infrastructure, including school connectivity.

Brazil completed a multi-band auction in November 2021 that was the largest ever in Latin America and served as the foundation for investment and propagation of 5G services. The government raised BRL 47.2 billion, equivalent to \$9.4 billion, from auctioning radio frequency bandwidths, 700 MHz, 2.3 GHz, 3.5 GHz, and 26 GHz, each with specific market applications and divided into lots. Successful bids were submitted by eleven operators, including market leaders, regional operators as well as six emerging market participants.

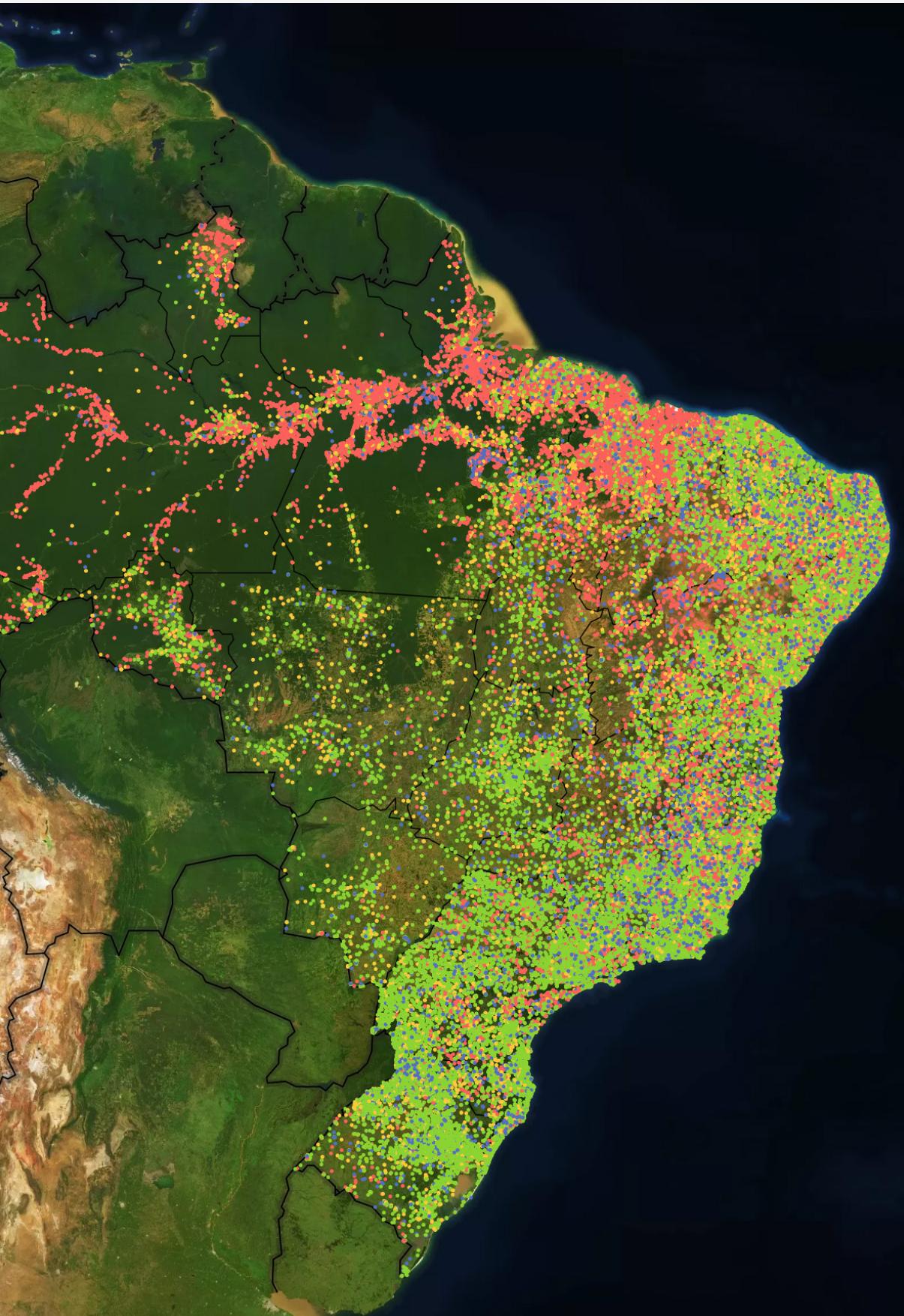
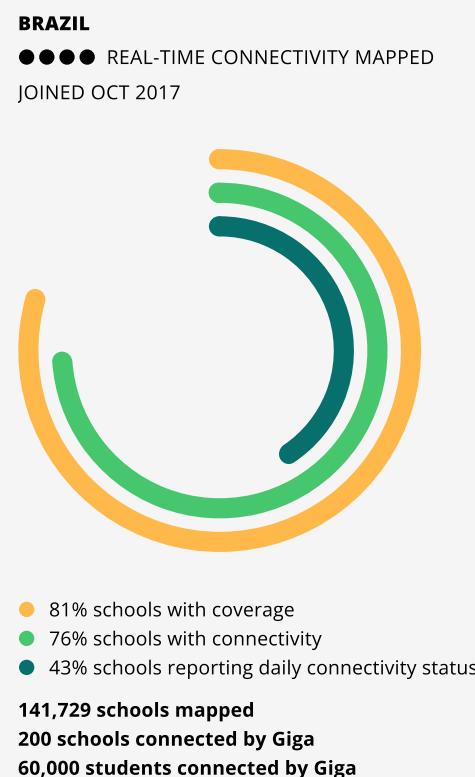
Through the auction process, Brazil established itself as a leader in spectrum management, striking a delicate balance between government infrastructure objectives, private sector needs while still prioritizing the socio-economic welfare of the most vulnerable populations. Giga's founding partner, ITU served as an advisor to the Brazilian government in the leadup to the country's 5G auction. Through advocacy efforts and using data from school connectivity initiatives, like Project Connect, the Government of Brazil established school connectivity as a requisite for winners in the 5G auction to connect schools to the internet. Hence, BRL 3.2 billion, (\$ 600 million), of the money raised will be set aside to achieve universal school connectivity by 2024.

To achieve this ambitious goal, decision-making, oversight, and administrative entities have been set up, including the Grupo de Acompanhamento do Custo a Projetos de Conectividade de Escolas (“GAPE”), which is the decision making and oversight body tasked with developing a plan to establish connectivity standards and deliver internet to schools. GAPE is composed of representatives from Anatel, the Ministry of Communications (“MCOM”), the Ministry of Education (“MEC”), as well as the 5 winners of 26 GHz band lots.

Subsequently, GAPE created an administrative entity tasked with executing the school connectivity projects defined, Entidade Administradora da Conectividade de Escolas (EACE). Each of the five winning bidders of lots in the 26 GHz auction are obligated to pay BRL 630 million to an account controlled by EACE. GAPE will also work closely with the Rede Nacional de Ensino e Pesquisa (“RNP”), the Brazilian National Education and Research Network, on procurement, provision of technical expertise and network delivery, and contract management, *inter alia*.

In July 2022, GAPE-designed pilot project that aimed to connect 181 schools, distributed across ten Brazilian cities, two cities per region, to connect to the internet with fiber for learnings and insights to scale up in the whole country. Therefore, the schools were selected based on criteria including the Municipal Human Development Index (IDHM), the percentage of students without internet, the density of Multimedia Communication Service (SCM) and the differentiated location of the schools (e.g., indigenous lands, quilombolas or settlements).

For transparency and accountability purposes, GAPE has also launched a dashboard with real-time updates on the initiative’s progress<sup>3</sup>. Information displayed includes the total number of active primary federal, state, and municipal public schools, the total number of urban and rural schools, the number of schools without internet, both urban and rural, the number of schools without a computer lab, and the number of schools without electricity. Giga will play an important role in the ongoing monitoring of connectivity, ensuring that schools receive consistent, high-speed access that they contracted.



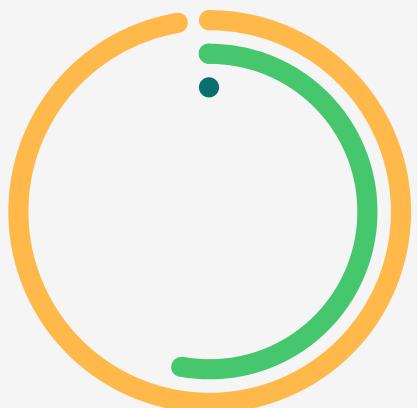
SCHOOLS IN BRAZIL (CONNECTED, GREEN/YELLOW; NO COVERAGE, RED; NO DATA, BLUE).

**UZBEKISTAN**  
● ● ● REAL-TIME CONNECTIVITY MAPPED  
 JOINED DEC 2021



● 83% schools with coverage  
 ● 95% schools with connectivity  
 ● 18% schools reporting daily connectivity status  
**9,783 schools mapped**

**RWANDA**  
● ● ● STATIC CONNECTIVITY MAPPED  
 JOINED JUL 2021



● 99% schools with coverage  
 ● 55% schools with connectivity  
 ● no daily connectivity status reporting  
**4,075 schools mapped**  
**363 schools connected by Giga**  
**396,545 students connected by Giga**

## Using Schools as Hubs to Connect Surrounding Communities: A Case Study from Giga in Uzbekistan

The cost to close the digital divide is significant and perpetual in nature. Beyond the initial capital expenditure required to connect a school, hospital or other public institution to the internet, internet access involves ongoing operating expenses, including monthly service fees, maintenance fees and electricity costs. These ongoing expenses represent a challenge to federal and municipal governments as they are often new budget line items, competing with existing needs against limited resources. To help governments defray the ongoing costs of connectivity, Giga is prototyping innovative, sustainable models which will serve as proofs of concept and can be scaled up at a regional or national level. In Uzbekistan, Giga and the Ministry of Education pioneered a successful “schools as a hub” model that both extends connectivity to the community immediately surrounding schools and generates revenue to fully offset the cost of connecting local schools.

Schools are anchors for community interaction, serving not only as a place where learners can connect with each other and with teachers, but also as a destination where people meet and engage in social activity. By design, schools are population ecosystems. Towards this, in collaboration with the government and UNICEF Uzbekistan, Giga launched a local competitive bidding process calling for commercial solutions to connect the most difficult to reach schools in the country and develop a model to prototype that also extends the benefits of connectivity to the surrounding community.

In August 2022, Giga, the government, and the local provider began implementing a scalable solution in which schools act as “connectivity hubs” and redistribute internet access to households, businesses, and other institutions within a 5-kilometer radius.

The diagram above depicts the process for materializing this model. The first being to identify a partner and define the model within the context

of the country and schools and the responsibilities of the stakeholders involved. In the case of Uzbekistan, Giga invested in the installation and set-up of equipment for the schools, which were connected to existing fiber backbone. The local provider is responsible for implementing the point-to-multipoint (PTMP) fixed wireless solution at schools, developing a competitive pricing scheme for the surrounding community and committed to enrolling a minimum number of new households per school by the end of the first year of operation. Secondly, based on the anticipated performance of the project, the next step was to assess how expenses and revenue would be shared. In Uzbekistan, Giga funded upfront installation costs whereas the local partner is responsible for ongoing expenses. The school receives a 50-50 profit share up to a cap.

Lastly, for sustainability, if revenue is expected to exceed a school’s operating expenses, establishing a channel and process for reinvestment is prudent. In Uzbekistan, under a separate contract, profit is directed to the Ministry of Education to connect more schools.

The lessons learned from this prototype will inform the government’s capacity to scale up this model and connect other schools in “hardest-to-reach” areas. Giga published a case study with the insights and the model can be replicated in other countries<sup>4</sup>.

In August 2022, Giga, Uzbekistan's government, and a local provider began implementing **a scalable solution in which schools act as connectivity hubs to redistribute internet access to households, businesses, and other institutions** within a 5-kilometer radius.



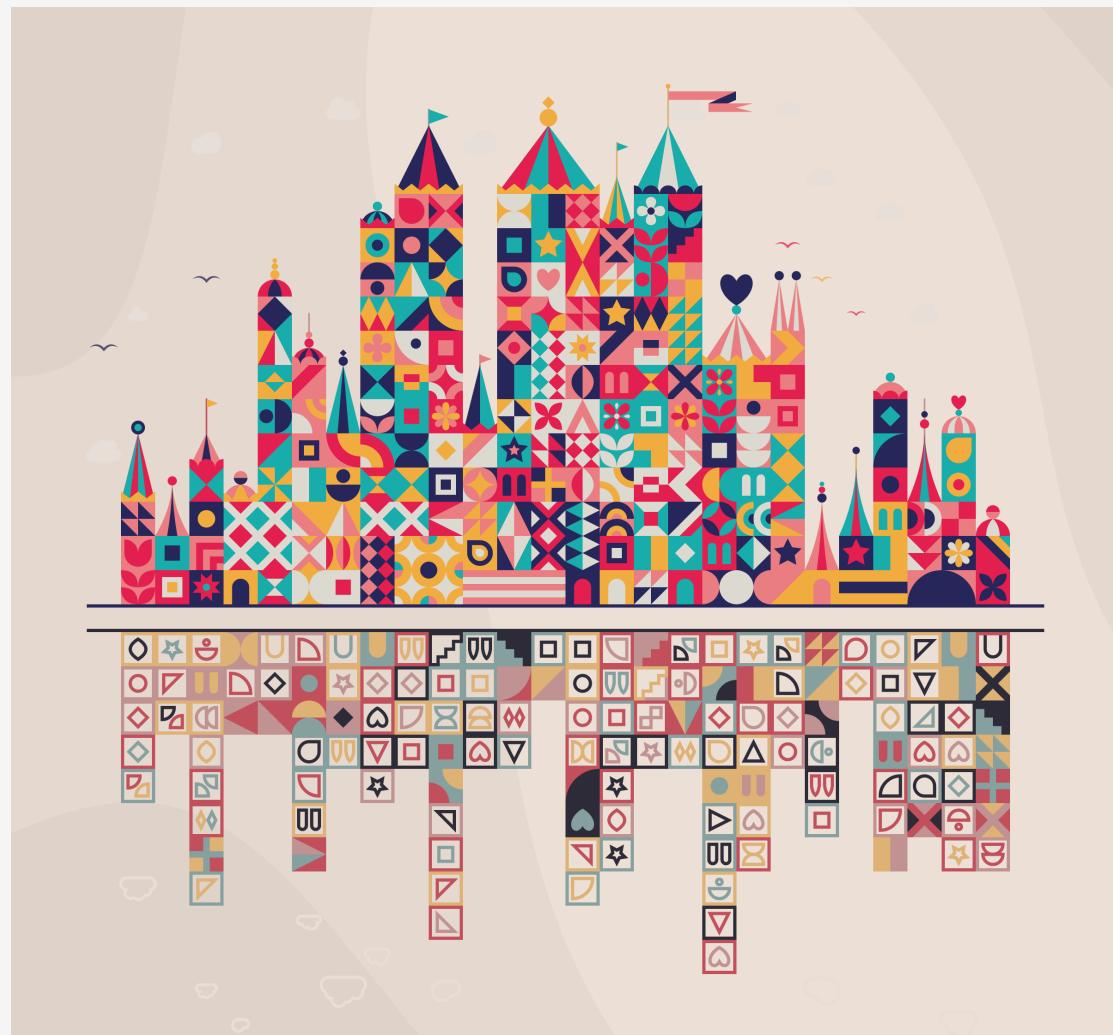
## Staking Ethereum to Finance School Connectivity in Rwanda

Connecting every school in the world is a big financial and technical undertaking that requires collaboration with a myriad of stakeholders and innovative financing modalities. Giga works with different partners on developing innovative financing models and mechanisms to sustainably connect schools. To afford schools with financing, Giga is exploring the nexus of blockchain and cryptocurrencies and connectivity at the level to which they can be leveraged to ensure transparency and accountability in the provision of connectivity by staking crypto and using the returns to finance school connectivity.

Rwanda is a key partner country and in collaboration with the Ethereum Foundation, the government, Launchnodes and Giga are prototyping this staking model. As a start, the Ethereum foundation donated 32 ETH for staking on an open-source cloud infrastructure<sup>5</sup>. The node was launched in May 2022, and to date, 0.42799 ETH, equivalent to ~1350 USD, has been generated. In line with estimated costs to connect a school in Rwanda, the average Capex and OpEx to connect one school in the country costs \$4,000. Evidently, more funds would need to be generated from this model to procure connectivity. However, what the results of this prototype offer beyond money generated, is the ability to raise funds and make digital payments in a more transparent way. Giga aims to build and capitalize on these results, eventually prototyping the connectivity of schools through the rewards garnered through this model, as well as developing smart contracts for procuring school connectivity.

## Financing School Connectivity through NFTs

Giga teamed up with Snowcrash and artist Nadieh Bremer to issue the UN's largest ever collection of non-fungible token (NFT) artworks: the Patchwork Kingdoms. NFTs are a unique, non-interchangeable digital asset record stored on the blockchain network and offer an innovative modality for stakeholders to support, fund and amplify the work of Giga. The first iteration of this fundraiser was to explore the use NFTs for fundraising in a fair, transparent, and accessible way. It entailed taking connectivity data on 283,000 schools from the Project Connect platform



1,000 PATCHWORK KINGDOMS, NADIEH BREMER

and transformed it into 1,000 unique Patchwork Kingdoms. Each square building block in the Kingdoms represents an actual school. The details in the data<sup>6</sup> that are conveyed in the art illustrate connectivity status and quality and the degree to which schools are marginalized and hard-to-reach. The patchwork kingdoms provide a vibrant display of the digital divide at a time when 1.3 billion children still do not have Internet access at home. The 1,000 Patchwork Kingdoms come in 24 different colour palettes and are based on real information about schools and their connectivity levels.

The fundraiser was a success with the digital art pieces selling out within three hours. Giga's 1,000 Patchwork Kingdoms shined a spotlight on digital inequality around the world. They have so far raised over US\$700,000 that will be used to help get schools in our partner countries online. Giga was also able to secure an unprecedented 20% royalty rate on secondary sales via OpenSea that translates to additional funds raised each time the NFTs are exchanged.

This venture provided insights on the potential that NFTs have for fundraising in the development space. Building on this momentum, Giga is developing a second collection of NFTs that explore how NFTs can be a vessel for community ownership over school data and a transparent way to ensure accountability.

**CASE STUDIES**

# Connect

## **Connectivity increases equitable & quality education to 10,000 Palestinian students in the West Bank**

Attending school gives children opportunities to succeed, and skills, competencies, and choices about the direction of their future life. School equals creating agency. In the West Bank, school attendance rates are lower in comparison to the average for the State of Palestine: More than one in 20 boys (5.2%) and one in 31 girls (3.2%) do not attend primary school and over a third of boys (36.8%) do not attend secondary school<sup>7</sup>. Most schools in the West Bank do not have access to the internet, as 3% of the unconnected schools in the State of Palestine are in underserved areas of the West Bank's "Area C". Key barriers to ensure delivering reliable connectivity in Area C include increases marginalization, restricted jurisdiction, limitations on building infrastructure, and difficulties in obtaining permits, thus increasing connectivity costs. In contrast, 96% of schools in the State of Palestine are connected and have more than 5 Mbps per school, while ~1% have inadequate quality of access to internet.

Giga in collaboration with the Palestinian Ministry of Education, the Palestinian Ministry of Telecom and Information Technology, and UNICEF Palestine, launched a competitive bidding process to aggregate the demand for connectivity across schools in the West Bank's Area C and seek proposals from the telecommunications industry to connect these schools to high-speed internet. The bid had an additional layer of requiring bidders to think of how they will sustainability provide affordable options, technology, and business models to ensure schools would remain online for years to come.

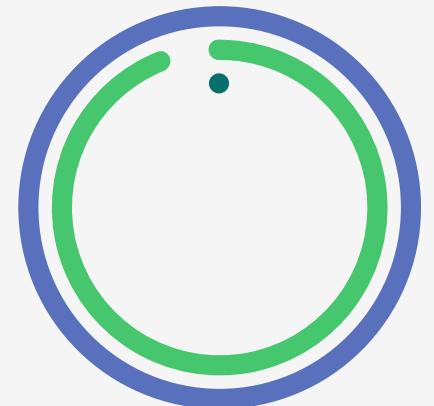
According to the Minister of Education, Prof. Dr. Awartani, "[this connectivity] project is in line with the ministry's current strategy and priorities, including its response to the technological and digital needs, and emerging challenges due to COVID-19 pandemic."

Through this process, Giga was able to connect, using wireless technologies, the remaining 76 underserved West Bank schools to high-speed internet making it possible for nearly 10,000 students, and 1,000 teachers to learn and teach online. Students say that they "like coming to school so [they] can use technology" and that "connecting to the internet

## CONNECT

## PALESTINE

●●● STATIC CONNECTIVITY MAPPED  
JOINED DEC 2020



- no coverage data
  - 96% schools with connectivity
  - no daily connectivity status reporting
- 2,935 schools mapped**

makes lessons and school more enjoyable and motivates [them] to come to school each morning". Teachers comment that the "use of the internet has created a positive impact on students learning, enhancing their participation and interaction in the classroom and increasing their involvement in lessons". Through a successful public-private agreement, this project has guaranteed sustainable connectivity to these schools, as the Ministry of Telecom and Information Technology will cover the recurring operating costs post installation. Moreover, the Palestine Authority is working with stakeholders in the public and private sector to transform education, reach thousands of children in the provision of digital services that allow students to learn using the latest platforms and digital applications, and leverage connectivity and technology to increase school attendance and access to high-quality education.

## Connecting Villages: Bridging the Digital Divide in Botswana

The government of Botswana launched the Smart Botswana Strategy (SmartBots), an action plan that aims to deliver a smart, sustainable society by digitalizing and transforming the public sector for more efficient service delivery. The key principles that underpin the strategy are leaving no one behind in the quest for universal connectivity and ensuring affordable access. To achieve this, the government is applying a "connect a village—connect all facilities" model. The rationale is to improve access to services by connecting all the facilities in the village, like schools, clinics, health posts, government facilities and dikgotlas (tribal courts where the community meet to discuss, deliberate, and make decisions on issues that affect them all).

The initiative, given its link to government service provision, was planned and budgeted by a team with representatives from several stakeholders, including the Ministry of Transport and Communications, Botswana Communications Regulatory Authority (BOCRA) and Universal Access and Service Fund (UASF), Ministry of Local Government and Rural Development, Ministry of Health and Wellness, Ministry of Agricultural

## BOTSWANA

●●● REAL-TIME CONNECTIVITY MAPPED  
JOINED SEP 2021



- 94% schools with coverage
  - 49% schools with connectivity
  - 6% schools reporting daily connectivity status
- 1,016 schools mapped**  
**600 schools connected by Giga**  
**4,051 students connected by Giga**

Development and Food Security, Ministry of Basic Education and Botswana Power Cooperation, under the coordination of the Ministry of State Presidency. Giga and UNICEF Botswana are also supporting the roll-out of the program and have contributed to the connectivity of part of the first phase of schools.

According to the Digital Connectivity Standards<sup>8</sup> defined by the government, the connectivity initiative is being implemented in four phases, with the aim to connect a total of 1,030 schools in 504 villages with a minimum of 50-100Mbps of data and 100 Mbps Wi-Fi connectivity. The bandwidth provided will depend on the size and needs of the school.

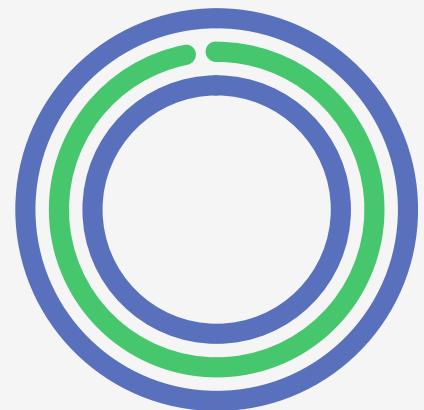
—Phase 1: Connect 605 schools and 53 colleges and vocational training institutions in 142 villages where BoFiNet already has existing backhaul infrastructure and low investment needed on high-capacity backbone network. Giga supported SmartBots school connectivity efforts in this phase, that is near completion with over 600 schools and 393,142 students connected. Teachers and students at harder-to-reach settlements like Somelo, no longer need to travel long distances to access connectivity. "Computers classes are my favorite! That's the only time I feel connected to the rest of the world and it's fun because we do a lot of things independently," says Orateng Mothowamadi, a 15-year-old student at Tshwaragano Junior Secondary School in Maun. The surrounding communities benefit from the school connectivity as they use the connectivity after school hours. In addition, the Ministry of Education and Skills Development has procured tablets for students to use at schools, and students have been trained on how to use them during their lessons.

—Phases 2 & 3: Connect 88 schools in 61 villages where there is no or minimal infrastructure and high need for investment on the backbone network. SmartBots has already identified service providers interested in connecting facilities in these phases, and the schools have already been pre-identified. In Phases 2 & 3, Giga is supporting SmartBots to connect some of the most remote schools to create a model that will help the government to mobilize resources from partners and investors and test solutions to connect the schools sustainably. Approximately \$6 million is needed to connect all these schools and

## CONNECT

**KYRGYZSTAN**

●●● STATIC CONNECTIVITY MAPPED  
JOINED JAN 2018



- no coverage data
- 99% schools with connectivity
- no daily connectivity status reporting data

**2,080 schools mapped**  
**697 schools connected by Giga**  
**29,020 students connected by Giga**

provide surrounding communities with the potential to use them as connectivity hubs.

—Phase 4: Planned to start in 2023, SmartBots aims to connect 316 schools up to the Digital Connectivity Standards and benefit 158,000 students. Giga is providing technical assistance towards mobilizing the finances needed to connect these schools. Once completed, this phase will have Botswana achieve universal school connectivity.

To improve accountability from ISPs to SmartBots in Phases 2, 3 and 4; Giga is working with the government to use Project Connect's real-time school connectivity data and assess providers' compliance with the service level agreements signed in contracts.

## Connecting the Hardest-to-Reach in Kyrgyzstan

In Kyrgyzstan, a mountainous landlocked country, rugged mountain ranges, deep gorges, high rocky peaks, and pristine nature have limited accessibility and render many villages in the mountains isolated and without electricity. In the southern area, in villages like Zardaly, Kyzyl-Oi and Enilchek, many schools can only be accessed after an arduous ascent on donkeys through the mountains, if snow does not block the trails.

Increasing access to connectivity in these areas requires innovation. As a mitigating measure, other learning alternatives have been applied, for instance, "ilimBox - internet in a box", a digital encyclopedia of electronic books, audio, and video lectures in Kyrgyz, Russian and English. However, students need increased access to the internet to have real-time access to information, develop their digital literacy and skills and to increase their access to the digital world and markets beyond their communities. In fact, since access to the world beyond their communities is an arduous task, connectivity becomes a lifeline for information, making connectivity even more critical for Kyrgyzstan schools.

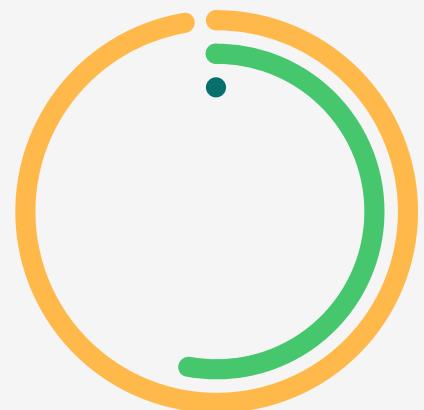
Giga has mapped all 2,080 schools in the country, and only ~1.8% of schools in the country remain unconnected.

Giga has already connected five schools as prototypes to inform the process to connect the additional 37 schools remaining. Connecting these schools requires nimble approaches to technologies and ad-hoc network designs, as well as financing solutions to ensure that they are connected to the Internet affordably and sustainably. In collaboration with the Kyrgyz Internet Society, Giga is developing a playbook of connectivity solutions and business models to test and provide internet to schools in these remote mountainous regions.

The lessons from this connectivity effort are being documented and will be used to evaluate and assess the feasibility of applying and scaling the solutions in countries with similar challenges.

**RWANDA**

●●● STATIC CONNECTIVITY MAPPED  
JOINED JUL 2021



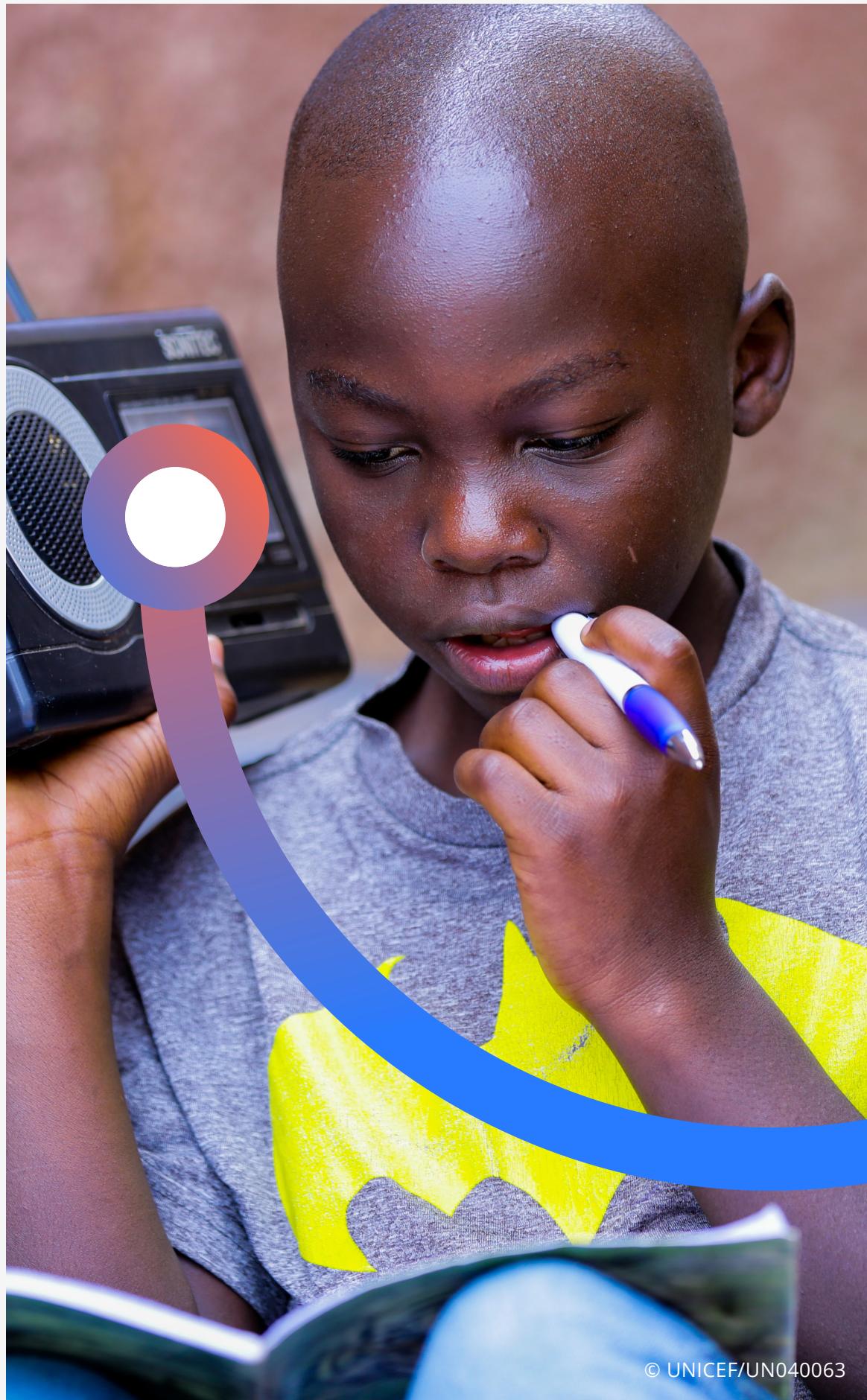
- 99% schools with coverage
- 55% schools with connectivity
- no daily connectivity status reporting

**4,075 schools mapped**  
**363 schools connected by Giga**  
**396,545 students connected by Giga**

## Advanced Wireless Technology in Rwanda for Higher Speeds at Lower Costs

Since 2019, Giga has worked with the Government of Rwanda to leverage high levels of coverage to close connectivity gaps and invest in connectivity classroom infrastructure. Nearly all primary and secondary schools in the country are within 30 kilometers of the fiber network and are covered by mobile broadband, yet 43% of them still lack internet access.

In collaboration with the Government of Rwanda, Giga is implementing a prototype to reduce connectivity costs for schools, improve speed and quality of service, and explore different redistribution models to extend connectivity from schools to the surrounding communities. Giga aggregated the demand for connectivity across schools in the Eastern Province and launched a common bid to provide broadband internet to 63 schools: 50 schools in the predominantly rural Bugesera district (including 8 schools without access to electricity) and 13 schools hosting refugees in the Gatsibo and Kirehe districts. All the schools are connected using an innovative fixed wireless solution.



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© UNICEF/UNI319828

Nearly all primary and secondary schools in Rwanda are within 30 kilometers of the fiber network and are covered by mobile broadband, yet **43% of them still lack internet access.**

This fixed wireless technology has unique capabilities to economize the number of towers and base stations, while providing speeds of up to 100 Mbps and a migration path to 500 Mbps to each customer. It is on this premise that Giga was able to secure minimum speeds of 25 Mbps and up to 150 Mbps—an improvement of 400% in connectivity speeds from the usual 5 Mbps that schools were connected through 4G. Giga was also able to secure a 30% to 55% reduction in the average price per Mbps paid by schools in the procurement process, from an average of \$20 to between \$9 and \$14 per Mbps.

The schools connected by Giga will eventually function as nodes/hubs for connectivity and financial services in their communities. Each school will report the quality of service of the received connectivity in real-time through the live visualizations in Project Connect, and with this information Giga will prototype the use of pay-by-performance models.

This prototype is a great example of crowding resources. The internet service providers invested additional resources of their own—beyond the contract value with Giga—to build additional infrastructure to reach these schools. Other international organizations have also leveraged on the connectivity work that Musk Foundation and Dubai Cares have enabled Giga to perform in the country, with UNHCR providing internet devices and solar panels to the refugee schools connected by Giga. Other partners have also provided power and devices to the non-refugee schools. By brokering connectivity models, Giga is catalyzing school connectivity in the region, creating tools for schools and partners beyond those piloted by Giga to use its model to connect other schools, essentially scaling the Giga approach and generating more impact.

**EL SALVADOR**  
●●● STATIC CONNECTIVITY MAPPED  
 JOINED MAR 2022



- no coverage data What
- 18% schools with connectivity
- no daily connectivity status reporting data

5,138 schools mapped  
 1,182 schools connected by Giga  
 236,593 students connected by Giga

## Schools connected using TV White Space in El Salvador

El Salvador 2020-2030 Digital Agenda aims to grow the digital economy, making connectivity and integrating ICT in schools a priority. Thus far, less than 70% of schools (approximately 3,146) are connected, and of those connected speeds remain limited, under 10 Mbps. Investments in the National Backbone have resulted in most communities getting 3G and 4G coverage, however, uptake remains low (55 mobile subscribers out of 100, and 8 fixed subscribers).

In its quest to ensure each student has access to the internet, El Salvador is exploring opportunities to use TV White Space End Client Antennas and Wifi APs or Wifi Mesh Networks to achieve 100% coverage in the near term, and then increase connectivity and use. To advise its use at national scale, the government (Secretaría de Innovación) partnered with Giga and UNICEF El Salvador, to pilot connecting 35 schools in remote coastal areas of the country to the National Connectivity Network (NCN). The NCN is a fiber optic backhaul network to connect all public entities in central and municipal governments, that is mounted on the country's electrical grid network. Using TV White Space, microwave PtP and Wi-Fi, schools were directly connected to the NCN; thus, enabling the Ministry of Education to integrate any future applications and connecting schools to other public entities such as ministries, and essentially providing the backbone for creating a digital ecosystem for the entire country. The schools also received high speeds of connectivity at 20 Mbps with unlimited data.

The pilot will leverage the partnership the government has with ETESAL (the national telecoms company) to prototype a business model where part of the returns from connectivity projects will be reinvested to extend connectivity to rural areas.



In partnership with UNICEF Honduras, ITU and the Government of Honduras, **Giga is in the process of connecting 24 schools** in remote areas in the country to high-speed internet.

11-14 JANUARY, ST. MORITZ, SWITZERLAND

## ● St. Moritz Crypto Conference

Giga and other crypto enthusiasts took part in a NFT auction at the St. Moritz Crypto Finance Conference, which was held at the Segantini Museum, Switzerland. Five unique art pieces were auctioned off at the event, raising over 40 ETH (\$140,000) for Giga, including a very special piece called the Patchwork Quilt that was bought for 10 ETH. Thanks to Nadieh Bremer, Jani Leinonen, Robertson Kappeli, and Philipp Schaeer for their NFT artworks and for supporting Giga's mission of connecting every school in the world to the Internet.

28 FEBRUARY-3 MARCH, BARCELONA, SPAIN

## ● Mobile World Congress

Giga was featured at the "Digital inclusion: what will it take to get everyone connected?" at GSMA's Mobile World Congress (MWC) in Barcelona, Spain, as an initiative to ensure every school and every student has the opportunity to connect in a digital world where 3.5 billion people live in areas with access to mobile network, but remain disconnected and cannot use technology as a vehicle to get education, do business and benefit from the opportunities of the digital world. BDT Director Doreen Bogdan-Martin underscored the vital need for collaboration across stakeholder groups to connect the 2.7 billion people that remain offline and provide meaningful connectivity to the millions more who lack it, for their participation in the digital society.

### YEAR IN REVIEW

# Key Events

4 MAY, NAIROBI, KENYA

## ● Government Capacity Building in Kenya

ITU hosted an ITU-UK-Kenya DAP Partners roundtable to share phase 1 work findings, reflect on the partnership's impact in Kenya, and how to scale collaboratively. The event brought together 100 key stakeholders, including UK Digital Access Programme partners, government representatives, development partners, private sector stakeholders in Kenya's digital ecosystem, and academics. The Roundtable supported Giga by hosting expert discussions on school connectivity. Some takeaways were that sustainability must be built into the design of connectivity projects, and schools should have a clear budget item for connectivity from the start otherwise the benefits accrued from connectivity may be lost once initial funding is over. The importance of aligning the next steps of the ITU-FCDO partnership in Kenya with the new Universal Service Fund strategy was highlighted, and to employ a collaborative design of future projects, including engaging the national ICT regulator and other DAP partners was emphasized.

Building on this momentum, ITU and Progressive Communication (APC) are planning two workshops to build capacity for the Communications Authority of Kenya (CA) staff to efficiently design and finance connectivity projects sustainably, particularly by disbursing the fund through grants. This will also support the launching of the new Universal Service Fund (USF) strategy (2022 -2026) and the next phase designing of USF funded connectivity projects, especially for schools.

The two-day workshop took place later in October and brought together approximately 30 representatives from the CA, primarily from the team that manages the Universal Service Fund (about 1.4 billion dollars per year) and other CA departments such as finance, procurement, and spectrum management inter alia.

23 MAY, BELGRADE, SERBIA

## Giga Patchwork Kingdom at Tomorrow Conference

Vladimir Trkulja, Giga's Blockchain Expert, presented our Patchwork Kingdom collection at the Tomorrow Conference in Belgrade, one of Europe's largest crypto and NFT conferences, showcasing how the initiative has helped build solutions that get it closer to its goal of connecting every school in the world to the internet, as well as the benefits of NFTs over other forms of fundraising.

23-26 MAY, DAVOS, SWITZERLAND

## 2022 World Economic Forum Annual Meeting

Giga ITU-UNICEF initiative was presented at the World Economic Forum in Davos on 23rd May 2022. Doreen Bogdan-Martin, Director of the ITU's Telecommunication Development Bureau and Catherine Russell, UNICEF Executive Director Catherine highlighted Giga's goal to connect 2.8 million schools and 500 million children to the Internet by 2030. They gave an update on the progress made since 2019 including the mapping of the location of more than 1.1 million schools in 44 countries, connecting more than 3,500 schools and the provision of access to 1.3 million students and teachers. They stressed the need from government and foundations to help raise \$5 billion in catalytic investment to help accelerate the process of bringing schools online.

6-16 JUNE, KIGALI, RWANDA

## ITU World Telecommunication Development Conference (ITU WTDC)

On 7th June Giga was featured at WTDC Partner2Connect Digital Development Roundtable Spotlight Session 1: Partnering to Transform Education.

In June 2022, Rwanda hosted the World Telecommunication Conference, where ITU members unanimously adopted a resolution 'Connecting every school to the internet and every young person to information and communication technology services', mentioning Giga as key vehicle to achieve this goal.

Fayaz King, the Deputy Executive Director, UNICEF and Chris Fabian, the Giga Co-Lead presented the progress made by the ITU-UNICEF initiative to connect every school in the world to the Internet by 2030. The panellists also included H.E. Paula Ingabire, Rwanda Minister of Information and Communications Technology and Innovation, H.E. Dr Tariq Al Gurg, CEO & Vice-Chairman, Dubai Cares and Mr Isaac Ntirampeba, a teacher from one of the schools connected by Giga.

On 16th June concluded the World Telecommunication Development (WTDC) and delegates underscored their collective commitment to universal and meaningful connectivity, and unanimously adopted a resolution aiming to ensure every school is connected to the Internet through the joint ITU-UNICEF Giga initiative (Resolution on Connecting every school to the internet and every young person to information and communication technology services).

8 JUNE, RWANDA

## UNICEF and Giga meeting with H.E President Paul Kagame

Fayaz King, the Deputy Executive Director of UNICEF, paid a courtesy visit to His Excellency Paul Kagame, the President of Rwanda on 8 June 2022. During this visit, Giga Co-Lead, Chris Fabian presented the visualization of connected schools in Rwanda that are mapped by our Project Connect Platform.

17-19 SEPTEMBER, NEW YORK, USA

## Transforming Education Summit & United Nations General Assembly (UNGA)

On Solutions Day, BDT Director Doreen Bogdan-Martin joined the "Data and Accountability" session to emphasize the importance of including meaningful school connectivity measures in the national benchmarks that will be used to track TES commitments.

On Solutions Day, Giga was showcased in the session "GIGA Initiative: Transforming Education through Digital Connectivity". Spain and Switzerland spoke about their contributions to school connectivity through their hosting of the Giga Technology Centre in Barcelona and the Giga Secretariat in Geneva, respectively. Ministers from Rwanda, Mongolia, Namibia, Botswana, El Salvador, Uzbekistan, and Malawi shared their experience, ambitions and appreciation for Giga.

On Leader's Day, UN Secretary-General António Guterres mentioned Giga in his opening remarks: "I urge countries to

improve connectivity for students and educational institutions. Our own Giga initiative aims to get all schools online." In the TES Vision Statement, the UN Secretary-General says, "Countries should take rapid action towards full educational connectivity and the international community must back the ongoing expansion of the Giga initiative to support country action."

On Leader's Day, during the Digital Transformation Spotlight Session, a call to action was issued, urging member states to make commitments across the three keys to unlock the power of digital teaching and learning: Content, Capacity and Connectivity. On connectivity it states: "We commit to adopting a whole-of-government approach and leveraging existing initiatives, such as Giga (UNICEF and ITU), to implement the policies, regulations, technologies, and financing required to ensure that school connectivity is safe, sustainable, and equitable." In his remarks, ITU SG Houlin Zhao reinforced the importance of Giga to the goal of connecting all schools.

21 SEPTEMBER, AMSTERDAM, NETHERLANDS

## Blockchain Expo World Series

Gerben Kijne, the Blockchain Lead at Giga, showcased how Patchwork Kingdom NFTs can help raise money for school connectivity and provide more children with the opportunity to learn online at Blockchain Expo on 21 September in Amsterdam.

JANUARY

## ● **A Perilous Plight: Connecting an isolated village in Southern Kyrgyzstan to the Internet**

Zardaly, an isolated village up in the mountains in Southern Kyrgyzstan, is home to about 150 people who live without electricity and communication. A mountain trail is the only direct route to Zardaly and donkeys are the most reliable form of transport.

## ● **Video on the Meaningful School Connectivity: An assessment of sustainable business models**

Boston Consulting Group (BCG), as ITU's Knowledge Partner, is supporting Giga to help further develop school connectivity operating models, based on different country typologies, forming a basis for helping countries achieve universal connectivity. The operating models include how connectivity is configured, how it operates, and how the business models would work for the network so that it is sustainable.

A business model is defined as an interlinkage of technology, operating model, funding structure, and cost structure that define the overall approach to the infrastructure deployment; a sustainable business model is one that can maintain itself indefinitely and is not dependent upon external (not-for-profit) grants and donations.

MARCH

## ● **Mapping schools in Sudan using artificial intelligence**

Thanks to a challenge run by Omdena, Giga now has a model that can identify schools in Sudan from satellite imagery with 95% accuracy.

## ● **How NFTs can give more children the chance to learn online**

To mark UNICEF's 75th anniversary, Giga teamed up with Snowcrash and artist Nadieh Bremer to issue the UN's largest ever collection of NFT artworks: the Patchwork Kingdoms. This blog post describes how the project has contributed to Giga's mission to connect every school to the Internet and considers the benefits of NFTs relative to other forms of fundraising.

APRIL

## ● **Connecting 24 Public Schools in Honduras**

In coordination with UNICEF Honduras and the Ministry of Education, Giga has launched a pilot project to connect 24 public schools in 7 departments of Honduras to the Internet. Telecommunications company América Móvil (Claro) will provide the Internet connectivity for an initial two-year period.

YEAR IN REVIEW

# Videos & Blog Stories

## ● International Day of Girls in ICTs: Access and Safety

Today we are celebrating the International Day of Girls in ICTs, an annual event to help girls access the digital tools they need to thrive in science, technology, engineering and mathematics (STEM) careers. This year's theme of 'Access and Safety' is closely linked to Giga's mission to give every child the chance to access the Internet and digital environment in a safe way.

JUNE

## ● Video and Blog “Giga transforms lives in rural Rwanda, one school at a time”

The Grupo Scolaire Nyagihunika is a Giga Rwanda connected school located 40km outside Kigali. On the first joint ITU and UNICEF Giga school visit in Rwanda on 8 June 2022, visitors included 20 Giga friends and partners alongside high level ITU and UNICEF staff, the State Minister for Primary and Secondary Education in Rwanda, representatives from the Ministry of Education, Ministry of ICT and Innovation as well as representatives from the local municipality. The video features the Giga connectivity installations in the school and how teachers and students followed classes where technologies and the internet were in use.

JULY

## ● New Giga profile video

This video showcases how the joint ITU and UNICEF initiative is helping to connect every school in the world to the internet by 2030. Giga can help students pursue their dreams to become a doctor, a journalist or a computer hardware engineer in the digital world. Today half of the schools in the world are not connected. Watch this video and find out how Giga uses satellite imagery to map school locations and Internet access, providing a real-time display of opportunities for funders and governments. It then helps governments to design the right connectivity solutions, establish enabling policies, create models for innovative financing, and contract for connectivity.

## ● Botswana makes strides in bridging the digital divide

Orateng Mothowamadi is a 15-year-old student at Tshwaragano Junior Secondary School in Maun and among 370,000 students who have benefitted from a connect the school initiative driven by the Government of Botswana in collaboration with UNICEF and Giga. Through the SmartBots and Giga initiative, schools are connected to high-speed internet to strengthen online learning and the bridge digital divide.

SEPTEMBER

## ● **The UNconnected podcast with Doreen Bogdan-Martin**

H.E. David Moinina Sengeh, Sierra Leone's Minister of Basic and Senior Secondary Education and Chief Innovation Officer, spoke with BDT Director Doreen Bogdan-Martin on his country's approach towards using technology in education and shared that more girls are now enrolled in school, than before the COVID-19 pandemic. Sierra Leone is among the 19 countries that have joined Giga. The Giga Accelerate project is currently working to connect 77 schools in this country.

The UNconnected is an ITU podcast series hosted by Doreen Bogdan-Martin, Director of ITU's Telecommunication Development Bureau. The podcast discussions focus on global collaboration to connect 2.7 billion people that remain unconnected to achieve socio-economic development for all.

## ● **Blog on “The power of ICT for education” by By Houlin Zhao, ITU Secretary-General**

This blog refers to the United Nations Secretary-General's speech at the Transforming Education Summit about “Content, Capacity and Connectivity” or the “three Cs” to unlock the power of digital teaching and learning and the importance of Giga to achieve the goal of connecting all schools.

OCTOBER

## ● **Video on Last Mile connectivity and blog “Giga connects children in the hardest-to-reach areas”**

The video and blog showcase how Giga has connected children to the internet in two remote locations that are worlds apart geographically: the Village of Zardaly, on top of the most mountainous region of Southern Kyrgyzstan and Kiwayu Island, part of an archipelago of islands on the most remote Northern part of Kenya's coastline in East Africa.

Giga is working to connect every child to the internet no matter how hard they are to reach. Thanks to Giga and the internet connectivity children will be able to access quality education and digital learning.

## Project Connect countries

				Partner countries
Algeria	Democratic Republic of the Congo	Kyrgyzstan	Saint Vincent and the Grenadines	Anguilla
Anguilla	Dominica	Liberia	Saudi Arabia	Antigua and Barbuda
Antigua and Barbuda	Dominican Republic	Malawi	Serbia	British Virgin Islands
Argentina	El Salvador	Mauritania	Sierra Leone	Dominica
Armenia	Ghana	Mexico	Slovakia	El Salvador
Bangladesh	Grenada	Mongolia	South Africa	Grenada
Barbados	Guinea	Montserrat	South Sudan	Honduras
Benin	Honduras	Mozambique	Sri Lanka	Kazakhstan
Bhutan	Hungary	Namibia	Sudan	Kenya
Bolivia	India	Niger	Tajikistan	Kyrgyzstan
Botswana	Indonesia	Nigeria	Thailand	Montserrat
Brazil	Jamaica	Pakistan	Togo	Niger
British Virgin Islands	Kazakhstan	Palestine	Uganda	Rwanda
Cameroon	Kenya	Panama	United Republic of Tanzania	Saint Kitts and Nevis
Colombia	Kosovo	Peru	Uzbekistan	Saint Lucia
Costa Rica		Philippines	Viet Nam	Saint Vincent and the Grenadines
		Poland	Zambia	Sierra Leone
		Republic of Moldova	Zimbabwe	Uzbekistan
		Romania		Zimbabwe
		Rwanda		
		Saint Kitts and Nevis		
		Saint Lucia		

APPENDIX

# Giga Countries

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