

Collaborative government websites standardization for digital sovereignty using Open Source

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@carpatic

Main talking points

- **The Rwanda story**
- **The principles for government websites**
- **Strategic Open Source Adoption**
- **The GovStack Building Block**
- **The next collaborative steps**

The Rwanda story

National standard for the websites of public institutions



The starting point - 2018

Outdated unmaintained web portals in various technologies

Hosted on different servers, not properly secured

Inconsistent user experience, different layouts, outdated content

High cost to maintain, change and upgrade

Low loading performance, low stability

A solution was required !

A plan is developed - 2018 -2019

- *Joined action of Rwanda Government (RISA), GIZ (German Cooperation Agency), TYPO3 Association*
- *4 on-site engagements by TYPO3 Association to support the planning*
- *Principles were defined, stakeholders identified, plan established*





Capacity building & implementation -2019 - 2020

- *A team of 10 web developers is coached*
- *The Gov.RW layout is chosen by open national contest*
- *Main Gov.RW and 6 ministries are implemented on a multi-tenant TYPO3 instance*
- *Coaching extended to DevOps and Cybersecurity: CI/CD, audit and monitoring, performance tuning*

Scaling up 100% by Rwanda - 2020-onward

- *Over 300 websites launched by Rwandan devs:*
 - *Government*
 - *Regional and local administrations (provinces, districts, cities)*
 - *National Agencies*
 - *Embassies*
- *National training center established for content editors*
- *National functional and technical support center operated by*
RISA



Welcome to Rwanda

What are you looking for?

Search

Visit Rwanda

Experience stunning scenery, distinctive hospitality and

Free Visa

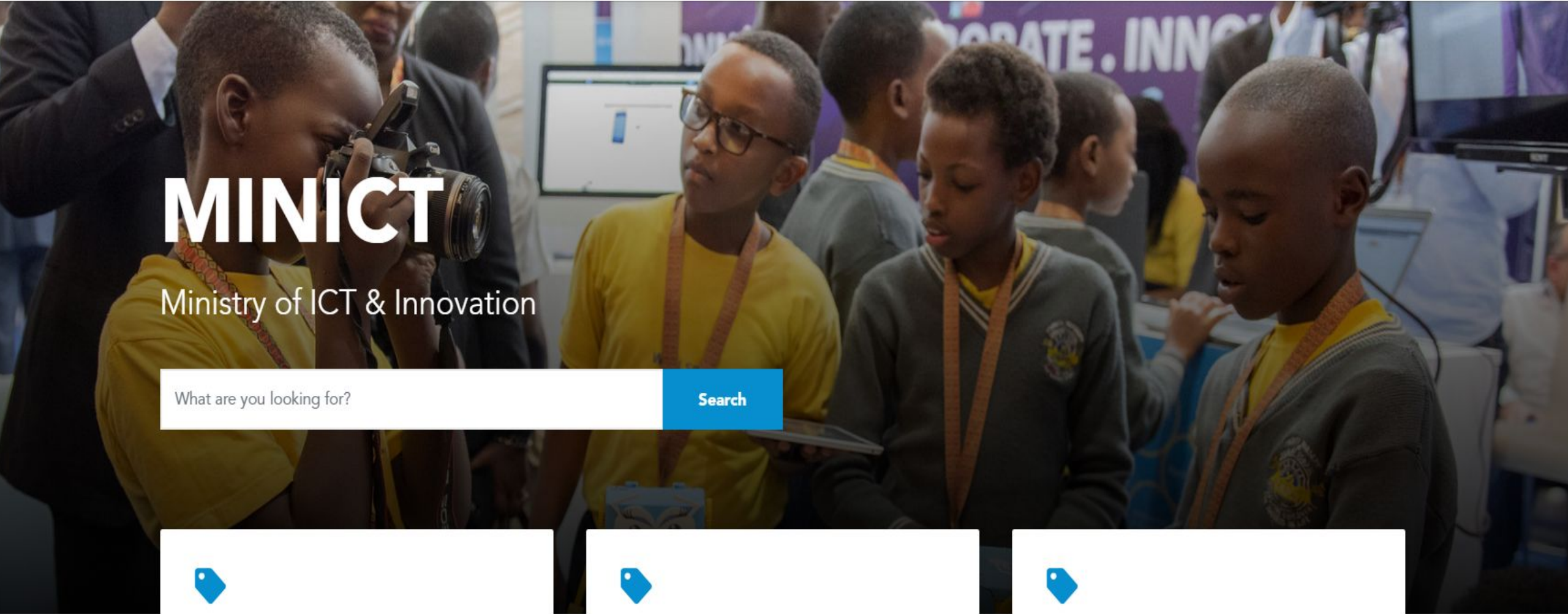
30-day Free Visa upon arrival for African Union

Doing Business

The 2nd easiest place to do business in Africa (World Bank

10.9%

GDP growth (2021)



MINICT

Ministry of ICT & Innovation

Search



Rwanda Economy Digitalisation

The Rwanda Economy Digitalisation Programme is an initiative to support a sustained shift to an inclusive, digitalised



Digital Transformation Directorate General

Digital Transformation Directorate General focuses on sector policy orientation and interpretation on ICT and Skills development.



Innovation & Emerging Technologies Directorate General

Innovation & Emerging Technologies Directorate General focuses on Guidance in



Ikaze mu

Ntara y'Amajyaruguru



Imiyoborere myiza n'ubutabera

Ishusho y'imiyoborere myiza n'ubutabera mu Ntara y'Amajyaruguru

[Read more →](#)



Ubukungu

Ishusho y'ubukungu mu ntara y'Amajyaruguru

[Read more →](#)



Imibereho myiza

Ibikorwa by'ingenzi birebana n'imibereho myiza y'abatuye Intara y'Amajyaruguru

[Read more →](#)

Results

- ***Over 300 websites launched by Rwandan devs:***
 - ***Government***
 - ***Regional and local administrations (provinces, districts, cities)***
 - ***National Agencies***
 - ***Embassies***
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RISA



Government of Rwanda

Total TYPO3 websites 2024

Numbers

300+

Gov.rw

1

Ministries

19 on 1 code instance

Districts

30 on 1 code instance

Backend users Gov.rw

300+



The GoR Website

Website
Responsive
Portal

National
Education

Backend users :
300+

Key achievements

- *Secure, performant, cost-efficient, and user-friendly content management software for all government websites and portals in Rwanda.*
- *Local skilled workforce, enabling independent local businesses to develop and maintain government websites.*
- *Sustainable local economic cycle, generating business opportunities and new employment*
- *Local open source tech community on collaborative democratic principles*

Read more: <https://typo3.com/blog/report-on-typo3-based-government-websites-in-rwanda>

Key principles for gov websites

The Websites of the Government need to be

- **Secure**

- Recognized secured frameworks
- Updated to latest stable maintained version
- Constantly patched
- HTTPS
- In controlled audited and monitored hosting infrastructure
- Have disaster recovery procedure in place. Full and incremental backups.

- **They should not be:**

- On outdated unmaintained frameworks
- On vulnerable platforms
- Without HTTPS
- On un-managed un-audited servers

The Websites of the Government should be standardized

- Much easier and less costly specification, implementation, extension, integration and maintenance
- Consistent functionality and user workflows in the backend (admin, content managers) and frontend (citizens, visitors etc)
- Easy to monitor, update, patch when needed
- Same needs from the hosting infrastructure, costs and risks highly reduced
- Predictable development and upgrade plans, the local company will be more prepared to bid and provide high quality

A Standardized Methodology needed for

1. **Development**
2. **Maintenance**
3. **Upgrades & updates & patching**
4. **Integration**
5. **Deployment and hosting**
6. **Performance monitoring**
7. **Cybersecurity audit and security monitoring**
8. **Disaster recovery**
9. **Technical support**
10. **Technical project management**
11. **Content migration**
12. **Training and onboarding for content editors**

The Websites of the Government should be multi-tenant

- **„Multi-tenant“ means:**
 - One single code installation for multiple websites (domains)
 - On a dedicated performant monitored hosting infrastructure
 - Each website (domain) has its own URL, layout, content , users
 - Each website can have its own specific functionalities and integrations
 - Upgrading the core code automatically updates ALL websites
 - Security patches apply at once for all websites
 - **Development cost is drastically reduced, Maintenance cost is drastically reduced**
 - If migrating to another framework in the future, content migration is done only once
 - **Security risks are highly reduced**

*Key principles for
governmental digital assets*

What a country needs

- **Control over the national data**
- **Independence from vendors**
- **Optimal costs**
- **Technical flexibility**
- **Stronger local businesses**
- **New high value jobs for locals**

How Open Source responds?

Control over the national data and systems

All data and resources generated are directly accessible and technically documented. Technology, architecture, platforms are fully controllable

- DIGITAL SOVEREIGNTY

Independence from vendors

Any supplier of technical services can be changed with ease and technical knowledge transfer is fast and costs little

- avoid “vendor lock in”, enhance competitiveness and eliminate the need for single-source procurement

Optimal life-cycle costs

No costs for licenses, no recurrent compulsory costs for technology

More possible vendors Infrastructure, architecture, technology and content can be managed unitary

Tech & data migration easy to plan

Technical flexibility

Technical models can be easier designed, replicated, extended, integrated

Technical components can be replaced easier

Tech upgrades can be done with less cost and risks

Stronger local businesses

Business opportunity more accessible for local IT companies

Higher predictability of state-run projects lead to more sustainability of local IT businesses

Supports development of stronger teams of experts in local companies

New high value jobs for locals

Jobs are more secure and job demand more steady

Technology specialization and excellence is encouraged

Community development, sharing and contributing develops the individual tech value

What kind of Open Source?

The “right” Open Source:

Very active project with constant commits by a large number of  TYP03 contributors

Existing number of developers that could be hired to develop and maintain projects

Continuous and predictable upgrades to keep pace with the technology (OSs, programming languages, databases, deployment methodologies etc), market demands and user expectations

Continuous development of the core framework, including constant security patching and performance tuning

Extensive, active and evolving repository of community-driven pluggable components

Coherent core product strategy, guided by the open source spirit and the community of developers

Fully documented project (code, functionality, installation/configuration/deployment, extension, integration)

The Websites of the Government should be open source

- Not dependent on the license vendor and their upgrade policies
- No license costs
- Local web development companies can develop and maintain them, no dependency on foreign companies and developers
- Frameworks continuously upgraded and patched for security
- Large international communities available for knowledge sharing

*How the Government **should do it***

High level Standardization:

Develop national models.

Build once, use everywhere.

A single institution must not “reinvent the wheel”

Optimal technical architecture:

Multi-tenant approach, multiple institutions using the same code base, with separated data and user governance

Standard hosting env, integration & deployment processes:

Unitary governance for hosting, backup, security audits, performance and security monitoring

Unitary CI/CD pipeline

Minimize tech governance burden:

The Gov is not a developer. Keep unitary supervision and enforcement of methodology

And let the private specialists do the rest

Think in terms of “life-cycle”:

Technology evolves, needs evolve: every system must be extended, upgraded, integrated and at some point replaced and disposed of, and data should be easily migrated

National tech capacity and expertise is a great asset for the country, its Growth should be TOP priority

Opportunity must be open through competitive accessible contracting

Support Tech Communities

Tech communities and communities of practice enhance knowledge spreading, business cooperation, access to new better projects and new better jobs

The GovStack Global projecy

GovStack Global

<https://www.govstack.global/>

- **Initiated by ITU and GIZ**
- **Takes the mission of providing open-source technology, technical specifications for digital services, and implementation support across government sectors**
- **Focuses on enabling countries to kickstart their digital transformation journey by adopting, deploying, and scaling digital government services**
- **Using the digital "building blocks" approach, governments can easily create or modify their digital platforms, services, and applications**

GovStack Building Blocks so far

1. Consent
2. Digital Registries
3. E-marketplace
4. E-signature
5. GIS
6. Identity
7. Information Mediation
8. Messaging
9. Payments
10. Registration
11. Scheduler
12. Workflow

Example of Building Block Structure

Workflow

1 Version History

2 Description

3 Terminology

4 Key Digital Functionalities

5 Cross-Cutting Requirements

6 Functional Requirements

7 Data Structures

8 Service APIs

9 Internal Workflows

10 Other Resources

Workflow



Developed by Khaled Ben Driss (Wevioo), Farai Mutero (HISP South Africa), Comfort Mankga (HISP South Africa), Dr. P. S. Ramkumar (ITU), Aare Lapõnin (Independent), and Taylor Downs (OpenFn)

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WAS THIS PAGE HELPFUL?



New Building Block: CMS

GovStack CMS BB - a Collaborative effort

- Objectives and principles
- High-level strategic requirements
- Functional requirements
- Technical requirements
- Data structures
- Integrability & Interoperability
- Recommendations for adoption and implementation

Next Steps under the Open Website Alliance

- Establish contributors steering committee
- Formalize the GovStack CMS BB Working Group, by ITU & GIZ
- Onboard the committed contributors
- Establish working plan, responsibilities and terms
- Develop the specifications
- Get feedback, enhance, get them approved
- **Prove them in action in new countries**



THANK YOU

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