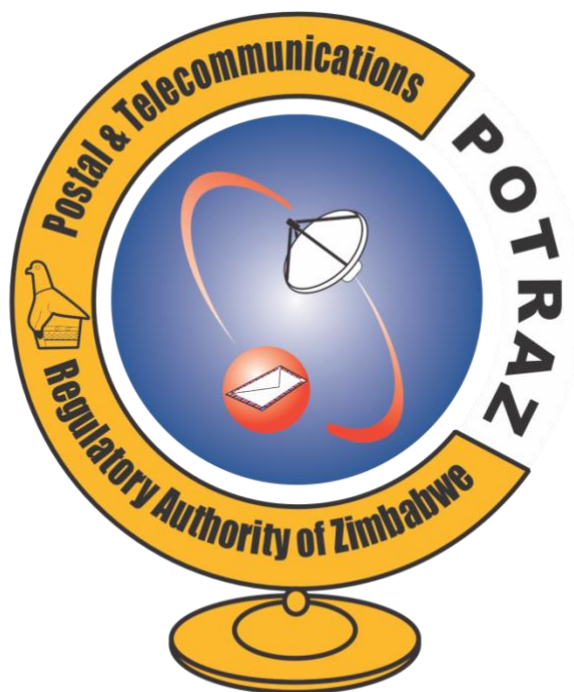


Consultation paper no. 3 of 2019



‘creating a level playing field’

**CONSULTATION PAPER ON DOMAIN NAME SYSTEM (DNS) FRAMEWORK and
.ZW ccTLD Management**

JULY 2019

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PREFACE

The domain name system (DNS) is at the core of the internet. DNS translates easily known names into Internet Protocol (IP) addresses which locates websites and services over the internet. Easy access to local domain names and growth in the local DNS industry has an impact on the local internet Eco system. Zimbabwe owns the .zw Country Code top-level Domain (ccTLD). This is an ISO 1366-1 alpha-2 code that is unique worldwide. The responsibility of managing the .zw ccTLD is with POTRAZ.

This document discusses the new DNS framework that POTRAZ envisage for the .zw ccTLD in Zimbabwe, focusing particularly on whether or not DNS service should be centralised or decentralised, whether or not DNS operations should be regulated or not. It presents views and approaches based on extensive research on the current best practice in Africa and outside Africa.

This consultation paper on new DNS Management framework is intended to generate discussion and solicit views from stakeholders in the industry. The views and discussion points summarised within the document should not be interpreted as determinations of the Authority. Stakeholders are requested to send their comments and views on the various issues addressed in the consultation paper by 9 August 2019 to:

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1. INTRODUCTION

Following the successful completion of the Regional Internet Exchange Point Setup, Zimbabwe now needs a vibrant DNS sector that promotes the use of local domains thereby saving foreign currency incurred in domain registration and licensing. Zimbabwe is always behind in implementing new technologies sometimes leaving our local internet users vulnerable to cybercrime. There is need for a DNS Policy for Zimbabwe,. There is also need for the setting up a new DNS Registry which will improve the way .zw domain names are registered.

1.1 Current DNS Management Structure

The Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) is responsible for the management and administration of the Domain Name System (DNS) in Zimbabwe . POTRAZ is the registered Sponsoring Organisation with the Internet Assigned Numbers Authority (IANA) for the .zw ccTLD. As such, DNS Administration is POTRAZ's responsibility both in terms of the Postal and Telecommunications Act [Chapter 12:05 of 2000] and in terms of the IANA.

In 2004 POTRAZ delegated the administration of the technical and operational aspects of the DNS in Zimbabwe to TelOne following a tender process in which TelOne emerged as the winner. TelOne then delegated the management of the Second Level Domains (SLDs) of .zw to other organisations, whilst retaining management of the ccTLD and the .org.zw SLD. The other registries that TelOne delegated the responsibility to are 1) University of Zimbabwe (.ac.zw) , 2) ZISPA (.co.zw) and 3) GISP (.gov.zw). Under this arrangement, TelOne is operating as a registry for the .zw ccTLD and as both the registry and registrar for the .org.zw SLD. ZISPA is operating as a registry for the .co.zw SLD and has a number of Internet Service Providers who are operating as registrars for the SLD. University of Zimbabwe is operating as both the registry and registrar for the .ac.zw and .edu.zw second level domains. GISP is operating as both registry and registrar for .gov.zw SLD

Question 1: Do you think this setup services the Zimbabwe DNS industry well, is there need to open more levels under .zw etc? Suggestions and comments are welcome.

1.2 DNS Policy

Zimbabwe does not have a DNS Policy in place. A DNS policy is an essential piece of legislation that clearly defines roles or industry players, define standards to be set, and also define levels of security to be put in place by data processors.

Many countries with successful DNS implementation have DNS policies in place, south Africa Included. A DNS policy is also important so that there is uniformity on the requirements amongst different registries. Currently in Zimbabwe every registry have their own DNS policies and that they use in registering domain names under their delegated SLDs. As a result, implementation of security measures depends on the willingness and capacity of each registry/registrar to implement their own measures.

Question 2: Do you think it is necessary to have a national DNS policy or Statutory Instrument to assist in the DNS Management In Zimbabwe?

1.3 Challenges of the Current Model

Although the current DNS Management structure has served Zimbabwe satisfactorily in the past, the model has some weaknesses and shortcomings.

1. The DNS registration process in Zimbabwe has remained manual and time consuming, thereby discouraging people from using .zw ccTLD because of lack of automation.
2. The fragmented manner in which the DNS has been implemented, presents a lot of security loopholes in the system thereby affecting DNS availability and reliability. Implementing security measures like Domain Name System Security Extensions (DNSSEC) is a challenge. For example, at what level do we implement DNSSEC? Is it at the ccTLD or at the SLD? ,Who meets the cost of implementing these security measures? Is it the sponsoring organisation or each registry/registrar meets the cost of implementing their own security measures?

3. There is no functional whois service in Zimbabwe. Implementing the service is a problem with the current structure of the DNS, thereby further compromising security within the DNS.
4. Growth of the DNS sector has been slow because there is no dedicated entity to make sure that DNS industry thrives. Most of the players managing the different levels of the DNS consider DNS management as peripheral to their core business since they can survive without it. As a result, there are no proper marketing programs for the .zw domain namespace and users are resorting to generic top level domains (gTLD) like .com and .net

Question 3: Do you agree with the challenges mentioned above? Do you have other challenges that you are facing with the current DNS management framework in Zimbabwe ?

1.4 DNS Case Studies

DNS Management Best practice recommends that these roles be kept separate since they have distinct responsibilities. When all the roles are separated we have a 3R DNS Model (Registrant → Registrar → Registry). However this is not always necessary to separate the 3 roles. Local circumstances may suggest that some or all of these roles can be occupied by a single entity resulting in the operation of a 2R Model where registrars are eliminated.

Well performing DNS markets in Africa, are using the 3R model. The best practice is to have a single DNS registry for a ccTLD. In the African region all the countries with the highest number of registered domains are using this model.

South Africa: In Africa the ZACR has the highest number of registered domain names surpassing the 1 million mark. An Authority (the ZADNA Authority) had to be setup just to regulate the DNS industry. A single DNS Registry (ZACR) was also setup to manage the technical DNS registration and to support the .za namespace. Other countries in Africa which employs this best practice are:, Nigeria, Egypt, Rwanda, Kenya, Zambia, Botswana, Malawi among others. They all operate a single DNS registry within their ccTLD.

Question 4: Do you agree that Zimbabwe needs to employ the best practice mentioned above for an efficient DNS management framework?

1.5 IPv4 and IPv6 in .zw DNS

The internet Protocol (IP) is the de facto standard in the transmission of data on the internet. Two versions of the IP protocol exist, with IPv4 being the first and most widely used version. An IP version 4 is a 32bit address which has proved to be inadequate to sustain this explosive growth of the internet. IPv6 was therefore introduced to solve the issues related to IPv4. It provides a bigger address space for internet devices. It must be noted that IPv4 networks do not talk to IPv6 networks, hence if someone is on an IPv4 internet connection, they are not able to access information on websites that have an IPv6 address. In order to address this challenge, major internet giants now provide services in both IPv4 and IPv6. Currently .zw ccTLD and all other domains under the .zw TLD are on IPv4. According to Google, Zimbabwe has the highest IPv6 usage in Africa but not even a single Zimbabwe domain has content on IPv6.

Question 5: Do you agree that Zimbabwe needs to adopt IPv6 in the DNS infrastructure?

1.6 DNSSEC

Recently vulnerabilities in the DNS were discovered that allow an attacker to hijack this process of looking someone up or looking a site up on the Internet using their name. The purpose of the attack is to take control of the session to, for example, send the user to the hijacker's own deceptive web site for account and password collection.

Domain Name System Security Extensions (DNSSEC), is a technology that was developed to, among other things, protect against such attacks by digitally 'signing' data so that one can be assured it is valid. The current .zw namespace is not signed. This means that there is no guarantee that one who accesses a .zw domain is accessing the correct website. The signing of the .zw namespace is of paramount importance in order to make the Zimbabwe's internet ecosystem secure.

Question 6: Do you agree that Zimbabwe needs to implement DNSSEC in the .zw DNS infrastructure?

1.7 Proposed New Structure

POTRAZ is proposing a new structure for the management of DNS in Zimbabwe and the setting up of a single DNS Registry Platform that will efficiently manage the automation of DNS registration and implementation of DNNSEC.

- **Sponsoring Organisation:** POTRAZ will remain the sponsoring organisation, responsible for policy and oversight function of the DNS industry. It will also select the ccTLD registry operator.
- **ccTLD Registry Operator:** The registry operator will be responsible for the registry database and the supporting infrastructure of DNS servers, WHOIS systems and so on. It will implement the policies and processes defined by the ccTLD registry and Sponsoring Organisation.
- **Registrar:** a registrar is an entity that is accredited by the ccTLD Registry Operator.

1.8 ccTLD Registry Operator

A registry operator can be a single entity or multiple entities (current Zimbabwe situation) which will be responsible for managing the .zw DNS registry database and the supporting infrastructure of DNS servers. The registry operator is key player in the Local DNS industry and its capabilities or lack thereof dictates the pace at which the DNS industry grows. There is therefore need for a technically competent DNS registry operator for the .zw ccTLD and also one which has sound business models. The ccTLD registry will be responsible for the routine operation of the registry and might have oversight on the various registrars in the sector. The Sponsoring organisation (POTRAZ) will license the registry operator.

The ccTLD registry may enter into a contract with another organisation for the provision of registry services. This contract would document the technical and operational implementation of the actual registry. The Sponsoring Organisation would normally have the ability to replace or reorganise the ccTLD registry:

The Government could have observer status in the registry's governance structure but would still be able to intervene if the broad public interests were not being addressed.

From a practical perspective, government would retain administrative control over the ccTLD while technical control rests with the registry

There are however many operational models that can be employed in licensing the DNS registry Operator, i.e:

a) Part of Government

The registry becomes just another department of the Government. In most instance being operated by the Sponsoring Organisation for instance and does whatever the government decides.

Although some registries operate as part of government, this setup is mainly for historical reasons and the general trend is to move registries away from the public sector to the private sector.

b) Outsourced Registry

Some countries have outsourced the operation of their ccTLD registry to one of the companies which provides this as a service. This can be done for pragmatic reasons, for example to rely on the infrastructure, technical expertise and other relationships of the registry operator that far exceed local capabilities. Sometimes it is to benefit from the business capabilities of the registry operator. The registry operator will work under a form of license that can be specific to DNS Operations.

c) Independent, externally regulated

In this model, the ccTLD registry is independent. And working on delegated authority by the Sponsoring Organisation (POTRAZ). It is not a part of government or a commercial enterprise. The usual types of legal construct for this would be a charitable foundation or non-profit membership association. Membership of the registry is open to the obvious stakeholders: registrars, user groups, internet service providers, trade associations and government. The members elect a management board and help the registry shape its policies. The government, in the form of the regulator, has direct involvement in policy formulation for the ccTLD.

d) Independent, self regulated

This model is essentially the same as the externally regulated one above. Once again the ccTLD registry is independent and working on delegated Authority by the Sponsoring Organisation. It is not a part of government or a commercial enterprise. The usual types of legal construct for this would be a charitable

foundation or non-profit membership association. Membership of the registry is open to the obvious stakeholders: registrars, user groups, internet service providers, trade associations and government. As before, the members elect a management board and help the registry shape its policies. However government does not get directly involved in registry policy-making, much of which is about matters of technical detail.

This means that the registry can be very responsive to changes in the industry and to local circumstances. It is generally found that bottom-up, consensus driven policy making is the most effective governance mechanism for Internet organisations. Since ccTLD registry will be operating a national resource in a delegated capacity, the registry will need to give regular updates to the Sponsoring Organisation on its operations and factors affecting its operations.

Question 7: Do you agree that Zimbabwe needs a dedicated Registry Operator solely setup for the purposes of managing DNS?

Question 8: Which DNS registry Operator model do you prefer? What are the reasons for your choice? (part of government, outsourced, independent - externally regulated or independent-self regulated)

Question 9: Do you agree that the Regulator will need to remain with regulatory oversight of the ccTLD Operator?

1.9 Paid / Free domains

In order to increase the uptake of local .zw Domain names, there is need to balance between cost and efficiency of the system. The most desirable option is to make domain registration as cheap as possible, i.e free. This will allow everyone to afford a domain name. the downside of this is that domain registration then puts an operational burden

on the registry without any financial benefit. This leads to poor quality of service and low investment in the sector. Thus it might also be argued that domain registration will need to be provided for a fee.

Another consideration that needs to be taken is that will domains need to expire after every year, or once a domain is registered there is no expiry.

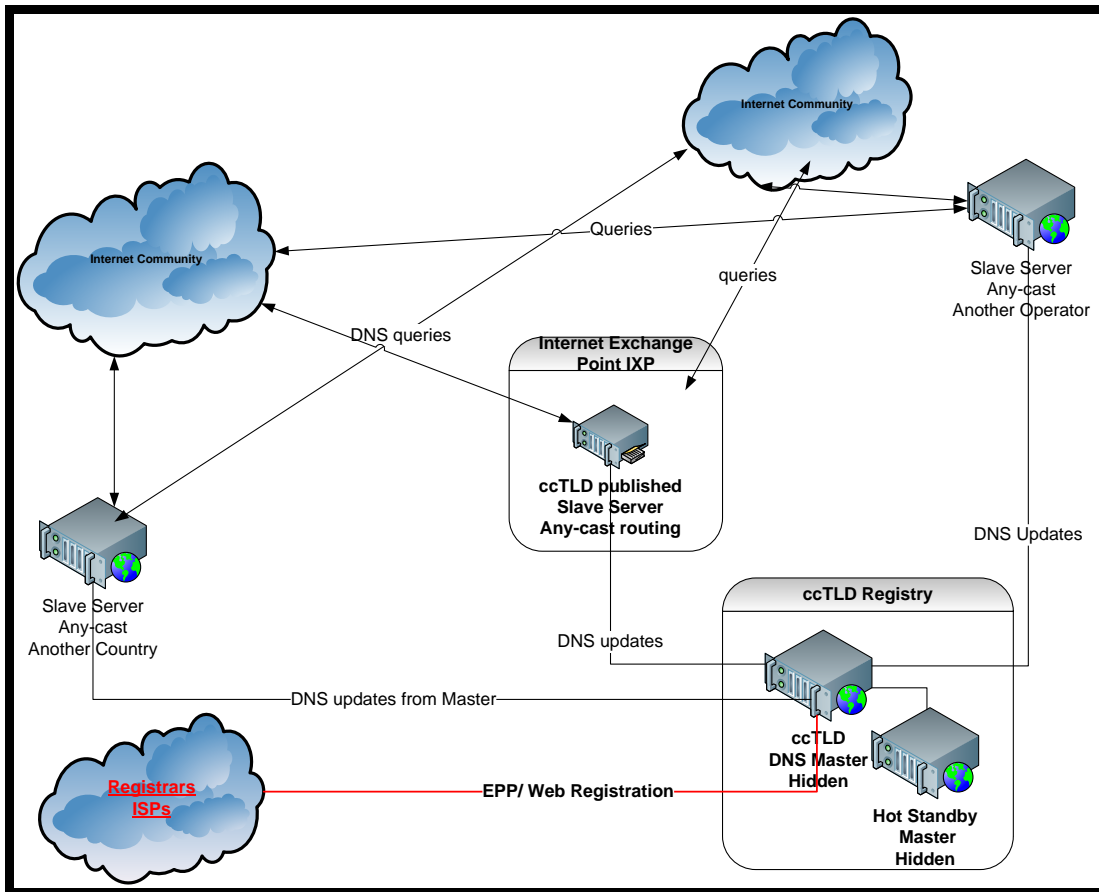
Question 10:

a) Do you agree with the notion that domain registration should be a paid for service?

b) should domain names expire every year once registered, or they should exist in perpetuity?

2.0 Proposed .zw ccTLD Architecture

- a. The DNS registry must have DNS servers at the IXP
- b. The registry must have DNS slave servers in another country so as to provide geographic redundancy.
- c. The DNS registry must provide anycast services.
- d. DNS master servers must not be directly accessible on the public internet for security reasons.
- e. The DNS registry must support EPP for Automated provisioning and registration of domain names.



Question 11: Do you agree to the proposed DNS architecture above? If NOT may you offer your suggestions.