Africa
A New Safe Harbor for Cybercriminals?

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At the end of 2012, Trend Micro cited three reasons why we think Africa is poised to become a new cybercrime harbor: We cited the availability of fast Internet access, the expanding Internet user base, and the lack of cybercrime laws in some African countries as the main reasons why Trend Micro believes so.

This research paper discusses the reasons cited above in more detail. By taking a look at the recent developments in the continent’s Internet infrastructure, we will map Africa’s journey to becoming a safe harbor for cybercriminals in the next three years or so.

In the past, Africa was not necessarily known for mobility and Internet connectivity. Recently though, Africa is showing signs of becoming a major player in the information and communication technology (ICT) arena, mostly brought on by the implementation of the United Nations (UN)’s eight Millennium Development Goals.

All UN members, including Africa, have agreed to reach eight common goals by 2015, including “developing global partnerships for development.” This goal has six specific targets, the most important of which, for the purposes of this research paper, is target B.F, which states that “In cooperation with the private sector, make available the benefits of new technologies, especially information and communication.”

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The African governments basically agreed to cooperate with private companies to provide ICT services to all of their citizens. The continent’s huge potential user base can make it a power player in this arena in the very near future. The UN Millennium Development Goals will definitely help Africa catch up with the rest of the world in terms of connectivity.

Several foreign companies have started investing in Africa, helping the continent develop its infrastructure. Local companies, including ISPs and phone service providers like Airtel Nigeria, have also been expanding their range of offerings.

In 2007, SEACOM built Africa’s first undersea fiber-optic cable infrastructure to connect its eastern and southern parts with the rest of the world. Africa is now well-connected cablewise, giving local ISPs the ability to provide cheaper and faster access types to customers. We found a wide range of access services throughout the continent, including dial-up, digital subscriber line (DSL), leased-line, fiber, Enhanced Data rates for GSM Evolution (EDGE), 3G, 4G Long-Term Evolution (LTE), and satellite. Local company, Airtel Nigeria, also completed its 4G LTE trial operations in Lagos, one of the cable landing points along the African coast. Several other infrastructure development projects are also underway in various parts of the continent.

Reasons Why Africa Is Poised to Become a New Cybercrime Safe Harbor

Availability of Faster and More Affordable Internet Access

Africa’s current cable infrastructure covers almost the whole continent, connecting its citizens with the rest of the world. Various private companies from different countries worldwide worked together to fund and implement six projects to improve Africa’s ICT infrastructure.

7 http://en.wikipedia.org/wiki/Fiber-Optic_Link_Around_the_Globe
8 http://www.itnewsafrica.com/2012/12/airtel-nigeria-completes-lte-trial/
Each project has a different investor. SEACOM, a privately funded, 75% African-owned company, funded the project that now serves the eastern and southern parts of Africa, with landing points in Europe and Southern Asia. WASACE is responsible for the largest cable project in the continent, providing competitively priced traffic distribution services, namely:

- **WASACE North**: New diverse route connecting Europe with North America.
- **WASACE South**: New route connecting South America with Africa.
- **WASACE America**: New diverse route connecting South America with North America.
- **WASACE Africa**: New route connecting Nigeria, Angola, and South Africa.

Funders of the WASACE cable projects cited above include VIP Must and the African Development Bank, along with other unnamed investors from Brazil and elsewhere.

Another good example of undersea cable projects in Africa is EASSy, which links South Africa with Sudan via landing points in Mozambique, Madagascar, the Comoros, Tanzania, Kenya, Somalia, and Djibouti. It incorporates the latest developments in submarine fiber-optic technology, making it economical to connect the eastern and southern coasts of Africa to the high-speed global telecommunications network.

![FIGURE 1: Main undersea Internet cables connecting the different regions of Africa with the rest of the world](http://www.eassy.org/)

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9 [http://www.seacom.mu/](http://www.seacom.mu/)
10 [http://www.wasace.com/](http://www.wasace.com/)


The following are the main cable infrastructure projects in Africa:

- **SEACOM**: Fiber-optic cable infrastructure connecting South Africa, Mozambique, Tanzania, Kenya, India, France, and the United Kingdom.\(^{13}\)

- **SAT-3**: International fiber that links Portugal to South Africa, extending across the Indian Ocean to Asia.\(^{14}\)

- **South Africa Far East (SAFE) Cable**: Optical fiber submarine communications cable linking Melkbosstrand, South Africa to Penang, Malaysia.\(^{15}\)

- **The East African Marines System (Teams) Cable**: A 5,000-km fiber-optic undersea cable that links Kenya’s coastal town of Mombasa to Fujairah in the United Arab Emirates (UAE).\(^{16}\)

- **EASSy**: A 10,000-km submarine fiber-optic cable system deployed along the east and south coasts of Africa to serve the voice, data, video, and Internet needs of the region.

- **West Africa Cable System (WACS)**: An ultra-high-capacity fiber-optic submarine cable system that links South Africa to Europe, spanning the west coast of Africa and terminates in the United Kingdom.\(^{17}\)

- **Globacom-1 (GLO-1)**: A cable system along the west coast of Africa between Nigeria and the United Kingdom owned by Nigerian telecommunications service provider, Globacom.\(^{18}\)

- **SAT-2**: A fiber-optic cable that runs from Funchal, Madeira and El Medano, Tenerife to Melkbosstrand, South Africa.\(^{19}\)

- **African Coast to Europe (ACE)**: A cable system along the west coast of Africa between France and South Africa managed by a consortium of 16 operators and administrations headed by France Telecom-Orange.\(^{20}\)

- **Main One**: Phase 1 of this cable system is a 7,000-km submarine cable with landing points in Nigeria, Ghana, and Portugal.\(^{21}\)

- **WASACE**: The most advanced undersea cable system across the Atlantic Ocean that offers two of the major international capacity routes and enables three new underdeveloped direct traffic routes—Africa to the United States, Africa to Latin America, and Latin America to Europe—along with potential connectivity from India to the United States over Africa and Latin America.

\(^{13}\) [http://www.seacom.mu/network](http://www.seacom.mu/network)
\(^{14}\) [http://fibreforafrica.net/main.shtml?als%5BMYALIAS6%5D=About%20SAT3&als%5Bselect%5D=4018621&conds%5B0%5D%5Bcategory%5D=About%20SAT3](http://fibreforafrica.net/main.shtml?als%5BMYALIAS6%5D=About%20SAT3&als%5Bselect%5D=4018621&conds%5B0%5D%5Bcategory%5D=About%20SAT3)
\(^{17}\) [http://wacscable.com/aboutus.jsp](http://wacscable.com/aboutus.jsp)
\(^{19}\) [http://atlantic-cable.com/CableCos/SouthAfrica/index.htm](http://atlantic-cable.com/CableCos/SouthAfrica/index.htm)
\(^{21}\) [http://www.mainonecable.com/network](http://www.mainonecable.com/network)
What Does This Mean in Terms of Security?

A number of projects that aim to increase the bandwidth in Africa have been started. Once completed, these are expected to cut costs for both operators and end users. More available bandwidth will benefit institutions and companies that rely on the Internet, but also attackers and cybercriminals. Greater bandwidth, after all, will not only mean faster and better Internet access but also faster and better means to launch attacks.

Expanded Internet User Base

Population

In 2009, Africa’s population reached 1 billion. This figure is expected to reach 1,073,380,925 in June 2012, according to Internet World Stats.

FIGURE 2: African country population comparison; the darker the color, the more populous the country is

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22 http://www.africanews.com/site/Africas_population_now_1_billion/list_messages/26588
23 http://www.internetworldstats.com/list2.htm
The 10 most populous countries in Africa are:

1. Nigeria
2. Ethiopia
3. Egypt
4. Congo
5. South Africa
6. Tanzania
7. Kenya
8. Algeria
9. Sudan
10. Uganda

**Internet Penetration**

According to Internet World Stats, Africa's Internet penetration rate as of June 2012 was 5%. The Internet penetration rate refers to the number of Internet users divided by the population, expressed as a percentage.

![Internet Penetration Rate Comparison](image)

**FIGURE 3:** African country Internet penetration rate comparison; the darker the color, the higher the country's Internet penetration rate is.

As shown in Figure 3, only a few African countries can be considered “developed” or “emerging” in terms of being connected with the rest of the world. Most of the countries have yet to garner high-enough penetration rates, most likely because they are politically unstable or have yet to catch up in terms of infrastructure.
The 10 countries with the highest Internet penetration rates are:

1. Morocco
2. Tunisia
3. Nigeria
4. Egypt
5. Kenya
6. Mauritius
7. Senegal
8. South Africa
9. Algeria
10. Uganda

**Internet User Base**

According to Internet World Stats, Africa had 167,385,751 Internet users as of June 2012.

*FIGURE 4:* African country Internet user base comparison; the darker the color, the bigger the country’s Internet user base is
The 10 African countries with the biggest Internet user bases are:
1. Nigeria 6. Tanzania
2. Egypt 7. Algeria
3. Morocco 8. Sudan
5. South Africa 10. Tunisia

Note that most of the countries with the highest penetration rates, except Mauritius and Senegal, which were replaced by Tanzania and Sudan, also made up the list of countries with the biggest Internet user bases.

What Does This Mean in Terms of Security?

The estimated number of Internet users in Africa as of June 2012 was 167,335,676. In 2000, this number was only 4,514,400. If the growth in volume continues, there will be millions of future Internet users—potential cybercrime victims—in the region.24

The exponential growth of Africa’s user base will force ISPs to lower service prices, benefiting both end users and attackers.

Lack of Cybercrime Laws

Only five out of the 57 countries that make up Africa have cybercrime laws in place.25 Some of the African countries that have some kind of cybercrime laws in place are:

- Cameroon: Cybersécurité et la Cybercriminalité au Cameroun (2010)26

The cybercrime laws cited above may, however, be outdated or do not apply to the current threats that abound in the security landscape. Some African countries are currently developing their own cybercrime laws, as they believe their governments are not sufficiently protecting their citizens from existing threats.31

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25 http://www.ictparliament.org/legislationlibrary/Cybercrime
26 http://www.ictparliament.org/node/3478
27 http://www.ictparliament.org/node/1904
28 http://www.ictparliament.org/node/1755
29 http://www.ictparliament.org/node/1742
30 http://www.ictparliament.org/node/1733
31 http://allafrica.com/stories/2012102220291.html
Some East African Community (EAC) member countries are also in the process of creating their own or adapting other countries’ cybercrime laws.32

**FIGURE 5:** State of African countries in terms of cybercrime law implementation

**What Does This Mean in Terms of Security?**

Improved infrastructure and an expanding user base in Africa, coupled by lack of cyberlaws, will, however, make it easy for cybercriminals and attackers to launch malicious activities without fear of being prosecuted. Though increased bandwidth and cheaper but faster access will benefit end users and businesses in the continent, so will they benefit bad guys. We may see more than just the usual 419 scams and hacktivist attacks originating from Africa in the very near future.

Current African Threat Landscape

Cybercriminal activities in Africa are not well-documented although a cyber robbery targeting a South African bank in January 2012 made the news.\(^3\) Africa is better known for cybercriminals engaging in 419 scams and hacktivist attacks.\(^4\)

Hacktivist attacks are especially common in North African countries, following the Anonymous attacks defacing several sites for political reasons. An example of this is an Algerian hacking attack that defaced several Romanian sites, including Google and PayPal.\(^5\) The hacker group behind this associated themselves with Anonymous and LulzSec. One of its members is Lagripe-DZ who owned the Twitter account, https://twitter.com/LagripeDz. With a little more digging, we also found the Facebook account, https://www.facebook.com/nadaz, and email addresses, islam90net.1@hotmail.com, which was used to register the domain, dz-net.org, and email address, islam90net@hotmail.com, which was associated with the attack.

Googling IslamDznet revealed a YouTube channel, http://www.youtube.com/user/islamDznet, and a Google+ account, https://plus.google.com/u/0/1108772155679389272401/posts. The Google+ profile uses the same picture as the previously cited Facebook account, https://www.facebook.com/photo.php?fbid=395017403845939&set=pb.10000130494005.-2207520000.1355447557&type=3&theater, which could mean they’re somehow connected. The account owner also used the same handle two years ago when he defaced other sites.\(^6\) He may have changed his handle to Lagripe-DZ soon after or at around the same time.


The Facebook page, Polat DZNet, aka Lagripe-DZ, had a subscriber named Faiz who claims to be a hacker. Note the interesting nickname he used for his profile page, https://www.facebook.com/anonymous.dz. We also found one of his Twitter followers, Kha&miX (Twitter: https://twitter.com/kmxdz32; Facebook: https://www.facebook.com/kmxdz) who claims to be part of the hacker crew, xDZx-TeaM (Dz HaCk3Rs).\(^7\)

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\(^3\) http://www.pcworld.com/article/248340/hackers_steal_6_7_million_in_cyber_bank_robbery.html
\(^4\) http://securityaffairs.co/wordpress/10131/security/joining-hands-against-cybercrime-in-africa.html
\(^5\) http://www.zone-h.org/archive/notifier=MCA-CRB
\(^6\) http://www.zone-h.org/archive/notifier=islamDZnet
\(^7\) https://www.facebook.com/xDZxTEAMx/info; http://www.zone-h.org/archive/notifier=xDZx-TEAM
Extent of Malware Infection

As expected, the most connected African countries and those with the biggest user bases also made up the list of most malware-infected countries. The top 10 African countries with the biggest number of malware-infected computers (from January 1–September 30, 2012) were:

1. South Africa
2. Egypt
3. Tunisia
4. Morocco
5. Comoros
6. Senegal
7. Guinea-Bissau
8. Nigeria
9. Ghana
10. Algeria
Africa is well on its way to becoming as connected as the rest of the world is. Mobile web surfing has become mainstream in the continent. Internet use, particularly for social networking purposes, is also becoming viral.

Every African is joining Facebook to meet and socialize with people from all over the world. Facebook currently has more than 51 million members. The top 10 African countries with the biggest number of Facebook members are:

1. Egypt
2. Nigeria
3. South Africa
4. Morocco
5. Algeria
6. Tunisia
7. Kenya
8. Ghana
9. Ethiopia
10. Congo

As shown, the same countries in our previous top 10 lists also made up the list above. The number of Facebook users increased from 27,414,240 in March 2011 to 40,205,580 in March 2012. If the growth continues, we can expect the total number of Facebook users in Africa to hit more than 50 million by March of this year. These numbers show that the African Internet user base is expanding and catching up, if only for social networking platforms.

**African Top 10 List Summary**

Note how the following countries showed up in every top 10 list presented in this paper:

- Algeria
- Egypt
- Nigeria
- South Africa

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38 [http://qz.com/38349/africa-now-has-more-mobile-subscribers-than-the-us-or-eu/](http://qz.com/38349/africa-now-has-more-mobile-subscribers-than-the-us-or-eu/)
Note also that only one of the countries—South Africa—has a cybercrime law in place. Kenya, which is part of the EAC, is on its way to create such a law. For now though, it is safe to say that we will see the number of cybercriminal activities targeting or originating from Africa increase in the next few years. We may even see attacks of a political nature, especially involving countries where tensions run high.

A new era is starting for Africa, which is, as Trend Micro CTO, Raimund Genes, believes is poised to become a new cybercrime harbor.

<table>
<thead>
<tr>
<th>Internet User Base</th>
<th>Internet Penetration Rate</th>
<th>Malware Infection Count</th>
<th>Spam Volume</th>
<th>Population</th>
</tr>
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<tbody>
<tr>
<td>Nigeria</td>
<td>Morocco</td>
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<td>Egypt</td>
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<td>Morocco</td>
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<td>Tunisia</td>
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<td>Kenya</td>
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<td>South Africa</td>
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<td>Comoros</td>
<td>Algeria</td>
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<td>Sudan</td>
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<td>Uganda</td>
<td>Algeria</td>
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<td>Senegal</td>
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<td>Tunisia</td>
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<td>Algeria</td>
<td>Mozambique</td>
<td>Uganda</td>
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</tbody>
</table>

References

- http://atlantic-cable.com/CableCos/SouthAfrica/index.htm
- http://en.wikipedia.org/wiki/Internet_in_Africa
- http://fibreforafrica.net/main.shtml?als%5BMYALIAS5%5D=About%20SAT3&als%5Bselect%5D=4018621&conds%5B0%5D%5Bcategory........%5D=Abo ut%20SAT3
- http://qz.com/38349/africa-now-has-more-mobile-subscribers-than-the-us-or-eu/
- http://waccable.com/aboutus.jsp
- http://www.africanews.com/site/Africas_population_now_1_billion/list_messages/26588
- http://www.eassy.org/
Top 10 Malicious URLs Hosted in Africa

Note that the malicious URLs in the following lists per country were recorded for the period spanning September 1–December 7, 2012 only. The lists contain the top 10 malicious URLs for each country except Chad, for which we only saw three.

**Algeria**

1. www.directdownloader.com
2. http://205.196.122.217/ejhiss0zymyog/tmnyozugga/2+AS.part05.rar
4. gfx.xnxx.com
6. www.openbitcoin.org
7. openbitcoin.org


**Angola**


**Benin**

1. http://welc0me.x10.mx/explorer.exe
3. http://i.bcooljs.info/bcool/javascript.js?channel=p26&hid=50895e064e7ca351179782
8. http://tracker1.torrentum.pl/scrape?info_hash=6%21%16%Bc%87%9f%07%9c%f3%69%e%7%C8%7%e%05%5e
9. denis.stalker.h3q.com

**Botswana**

2. i.trkjmp.com
5. http://ads.alpha00001.com/cgi-bin/advert/getads.cgi?tid=1371&type=jsn&kws=&srv=tuto4pc_my_1&format=redirect&label=
7. http://clkh71ybyks66.com/9EN3kvv05Q3JUh/OwZG9ch0mWTEKePRzvDpGxAgNf60Po+63/jZ30MPl/DCLTpjuvmvpesKeVd7j/dCr6rVrhN7i3WHLXCMOvAMRZayqZFN2lOeq5pbdOxEOxO5jK5yOZ7yyVVLSTNXS3CRbeU00WyHtKfAJ5k0sKkqvKQxhPeWEdn6yPoZjPMxSt7ZkXo+A1CZeR3u+UgMyWvPvHmDBUu2pOYlaYXcoawekI5Z2EVQvRan3irSTbwCnGcJ53n0Z3Y2d0d8EY2XRlsfI4Q2GB3lI++kUe+a++YMUIhSc+NeW5e5B82wlljOA6K6T1wTLJy+O4gPAYSom4n5cp4Bj4cq OMGDMxvTHlOdwCICg=
8. http://clkh71ybyks66.com/9EN3kvv05Q3JUh/OwZG9ch0mWTEKePRzvFmsNvMHxhi7dPAIVNw/mZUZms66HyyBwBYO6xkKVPPa/S6wh+3CuaZQeBlhABLhxpaachGejwBKkuwaCEUbvg7c07d4STW7GCQ6OLnr9RwrWB0qab0jXDJS9mMPouublAnTHxexpDKEl2N8t8A/BpNyeg+Edk0x6LbhiQV3LYnD9zrSFSokTW6wv2qirI5GRVOM5oa733+jLiDzXVfjVonn8Sk6d54f144==

**Burkina Faso**

1. denis.stalker.h3q.com
2. http://welc0me.x10.mx/explorer.exe
5. router.bittorrent.com
### Burundi
7. `http://acces.direction-x.com/a.php?t=31&n=3&pg_b_format=300x250&tc1=mrsexe&tc2=test_m&pgid=6949&rebuild=1&o=b&`
10. `http://sz0m.secureintl.com/?s1=200978`

### Cameroon
4. `denis.stalker.h3q.com`
5. `www.torrent-downloads.to`
6. `tracker.torrentum.pl`
10. `cg-global.maxymiser.com`

### Cape Verde
5. `http://srv.cpvmarketplace.info/display/pop.jsp`
6. `SILVIA-PC.domain.invalid`
8. `wpad.domain.invalid`

### Central African Republic
2. `http://syndicatemedia.download.premiumtv.co.uk/crossdomain.xml`

### Chad

Congo

3. http://welc0me.x10.mx/explorer.exe

Djibouti

2. gfx.xnxx.com
5. http://welc0me.x10.mx/explorer.exe

Cote D’Ivoire

1. http://www.abidjan.net/js/titrologie_rotation.js
3. http://welc0me.x10.mx/explorer.exe
5. http://timalin.0fees.net/index.php

Egypt

4. denis.stalker.h3q.com
5. www.effectivebrand.com

Equatorial Guinea

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2. cnfg.montiera.com
4. mpsnare.iesnare.com
5. lux-bn.com.ua
9. gfx.xnxx.com

Eritrea

2. http://64.74.223.38/wpad.dat

Ethiopia

2. host.imhoporn.com
3. router.bittorrent.com
6. denis.stalker.h3q.com

Gabon

1. dl.commentcamarche.net
6. cg-global.maxymiser.com
7. http://cdn.recomedesite.com/js/jq/jquery.3d.min.js

Gambia

2. http://logo.webservis.gen.tr/a.js
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Ghana
2. router.bittorrent.com
8. http://srvc.cpvmarketplace.info/display/pop.js

Kenya
3. router.bittorrent.com

Lesotho
7. dplus.en.softonic.com
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Liberia
5. www.fbooksllum.com
6. http://m29m.in/in.cgi?xapads

Libyan Arab Jamahiriya
1. http://i.trkjmp.com/crossdomain.xml
5. denis.stalker.h3q.com
8. http://i.trkjmp.com/kwddc7c=TFk6NJ%E6VHJpcG9saTp3d3cueW9ldHViZSSjb206ei0x
7MY2LTzODU0cb=GPl_items.a652c.displayKeywords
10. http://i09169.86.172/root/config.bin

Madagascar
1. http://track.qvod.com/?info_hash=%D3%83%E2%F%0D%E5%J%7F%07%E5%F%A6%1Dm%22%E9%8D%81&peer_id=5%C0zRO061357A400A3348&port=80&uploaded=0&downloaded=0&left=50991206&compact=1&numwant=200&event=started
2. http://track.qvod.com/?info_hash=%B4%A1%4%61%9%4%6%1%2%9%F%A%4%4%F%9%D%DA&info_hash=J%23E%B1%84%7%D%4%9%A%C9%EA%EBq%A5%8CP&info_hash=%C9%E5%7%C%05%22%AC%89C%C4%ABq%F%E%C%2O
3. http://205.252.166.30/tds/?s=b
4. http://www.torrentrealm.com/scrape.php?info_hash=%BA%24I%BB%DCu%C4h%DC%CA%0K%A0%8%B5%B5%F2Q
8. http://prof.pctuto.com/cgi-bin/get_config.cgi

Malawi

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1. http://timalin.0fees.net/index.php
3. http://welc0me.x10.mx/explorer.exe
5. up.a7aneek.net
7. http://systemx.0fees.net/system.jpg
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