Enterprise Features

for Small Businesses Running WordPress

by Meitar "maymay" Moscovitz (maymay.net)

Thank you to our hosts, the WP NYC Meetup and its organizers, Steve and Scott.

Thank you to Microsoft, who provided us with this space to meet.

Let me take a moment to introduce myself.

The Information Age equivalent of Johnny Appleseed

Hi, I'm Maymay. (Download my digital business card.)

I am a free software developer and technology consultant and I work without money. Instead of owning a home, I live on the road, so that I can travel to do Good Work with Good People for the benefit of our future. I've been called the "Information Age equivalent of Johnny Appleseed."

In my former life, I was a software engineer and consultant for Fortune 100 companies such as Hewlett Packard and Lehman Bros. But I hated those jobs and I wanted to make a difference in the world instead of helping bankers line their pockets, so I quit corporate America in 2007. I've been freelancing ever since.

Are you trying to make a difference, too? Do you have a project that needs a skilled programmer? Are you looking to make a bigger impact through wide exposure? My projects generally make the news. Pique my interest, and I will come to you.

Projects I have worked on recently include:

- **Buoy: A community-based crisis response system**
  A free software, decentralized platform for emergency response that offers an alternative to 911. Because friends don't let friends call the cops.
  - A World Without Police: Buoy, a Web App that Builds Autonomy
  - TWiT.tv's FLOSS Weekly, episode 385: Buoy
  - People of Interest, February 8th, 2017 (MP3) (starts at 35:23)
  - Newscastic: 7 Albuquerque-Made Apps That Will Change the World

Source: maymay.net

My name is maymay. This is a screenshot of my homepage, at maymay.net, spelled like the month of "May," twice. I get DoS'ed occasionally, so apologies if my site is currently down. Go there to learn a little bit more about me and the kind of work I do. Meanwhile, let's get right into it. First… [NEXT]

Agenda

1. ~~Who am I?~~

2. Spin up a new WordPress Multisite instance

3. Plugin demos:

   3.1. Subresource Integrity Manager (for WordPress)

   3.2. GPG/OpenPGP signing and encryption (for WordPress)

   3.3. Centralized Authentication Service (OpenLDAP for WordPress)

4. Questions and (hopefully some) Answers

…a brief overview. I already talked about myself, so I won't bore you with much more of that.
Next, [BUILD] we're going to quickly spin up a new WordPress Multisite instance.
After that, [BUILD] I'll demo three WordPress plugins I wrote that you might want to know about.
And finally, [BUILD] if there's time, we can do some Q&A. [NEXT]

Spin up a new WordPress Multisite instance

All right. Let's begin.

[DEMO: switch to the Web browser to hit http://wpnyc.demo/ to show it doesn't exist, then to the command line and run the `vv create …` command. Then, return here.]

So, very briefly… [NEXT]

Install these helpful programs

1. VirtualBox.org
   Type 2 virtual machine hypervisor

2. VagrantUp.com
   Virtual machine hypervisor automation tool

3. VaryingVagrantVagrants.org
   Vagrant config for WordPress development

4. Variable VV (vv)
   github.com/bradp/vv
   Great VVV command line helper utility

…if you don't already know about these tools, consider learning about them. This is my devops toolchain for this demonstration:
1. [BUILD] Virtual Box is a Type 2 virtual machine hypervisor.
2. [BUILD] Vagrant is a tool that automates Virtual Box configuration.
3. [BUILD] Varying Vagrant Vagrants or "VVV" for short is a Vagrant config purpose-built for WordPress development, and
4. [BUILD] Variable VV is a great command line helper utility that makes it easy to create new VVV configs.
Using tools like these makes WordPress development workflows much safer and more robust. In a few moments, we'll have a totally new WP Multisite install running. While that's all building, we're all here to learn about… [NEXT]

Enterprise

…"Enterprise" features for small businesses running WordPress. I'll assume we all know what "WordPress," "small businesses," and "features" mean. But, what does…
[NEXT]

…"Enterprise" mean? Some of you may think you already know the answer to this… [NEXT]

…and that's fine. I'm not here to tell you what to think. That's your employer's job. Instead, to make sure we're on the same page, here's what I mean when I say "enterprise." What I mean when I say "Enterprise" is… [NEXT]

Important capabilities

for secure and private collaboration

which utilize multiple tools simultaneously

sold to larger corporations

that have a lot of money.

[READ AND BUILD SLIDES, then…]
In other words, anything related to:
*   process or workflow automation, especially objectives that touch multiple disciplines at once, or
*   tools that interoperate across multiple vendors to try avoiding vendor lock-in, or
*   capabilities perceived by some people to be "advanced" or even unnecessary for small groups, particularly security and privacy features.
In short, systems or tools that provide truly resilient autonomy. With that said, I see my role… [NEXT]

How you can hire me:

You can't. **I don't work for money.** Money is a technology that destroys trust and human relationships. Its entire purpose is to short-circuit our relationships in order to insert itself as a middleman. It makes everybody spend more money, at more emotional cost, for things that make us angry at each other. Don't offer to pay me. Seriously. If you offer me money, I will decline on principle.

I don't sign contracts or make any kind of exchange agreements. I work on projects because they inspire me and I work at my own pace—which is typically very, very fast. Have an interesting project, make it ambitious, get me excited, and you will be amazed what we can do together.

I don't work on proprietary products. I am an avowed anti-capitalist. Anything we build together will be freely shared with others who can also benefit from it. If your project so much as pretends to have a profit motive, I will tell you to go fuck yourself and your project. Yes, really.

I do work best when I'm warm and dry, well-fed, have a safe place to sleep (this can be as simple as a quiet side-street on which to park my car), and am surrounded by curious, intelligent, integrious humans who are passionate about making the world better. Cats are good company, too.

…as a Free Software developer… [NEXT]

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…to make it more possible for more people to independently access more capabilities, without needing to have money, and without needing to engage in other forms of abusive relationships, to do so. This is especially important to do in service to and in solidarity with the specific people whose lives are made dramatically worse by capitalist efforts to do the contrary.

So! [NEXT]

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…let's see where we are with the build of our new website. [SWITCH TO BROWSER, try to load http://wpnyc.demo to see if the build is done. Click around a bit to show that it's an empty WP Multisite install, then… NEXT]

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Okay, we have successfully created a brand new WordPress Multisite install. Let's move on to learn about…

Subresource Integrity Manager (for WordPress)

…the Subresource Integrity Manager for WordPress. First,… [NEXT]

"Subresource Integrity"?

…how many of you already know what Subresource Integrity refers to? [PAUSE FOR AUDIENCE PARTICIPATION]
I really like the Mozilla Developer's Network definition, which is… [NEXT]

"Subresource Integrity (SRI) is a security feature that enables browsers to verify that files they fetch (for example, from a CDN) are delivered without unexpected manipulation. It works by allowing you to provide a cryptographic hash that a fetched file must match."

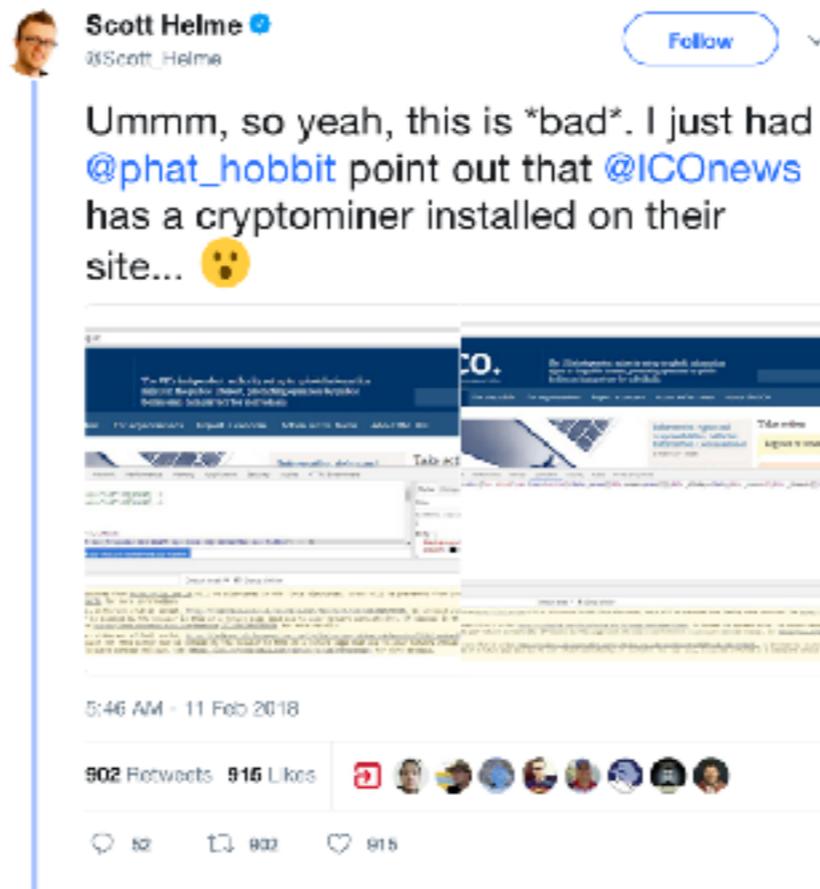–Mozilla Developer Network, Web Security Documentation

Source: https://developer.mozilla.org/en-US/docs/Web/Security/Subresource_Integrity

[READ SLIDE, then…]
For example, let's say… [NEXT]
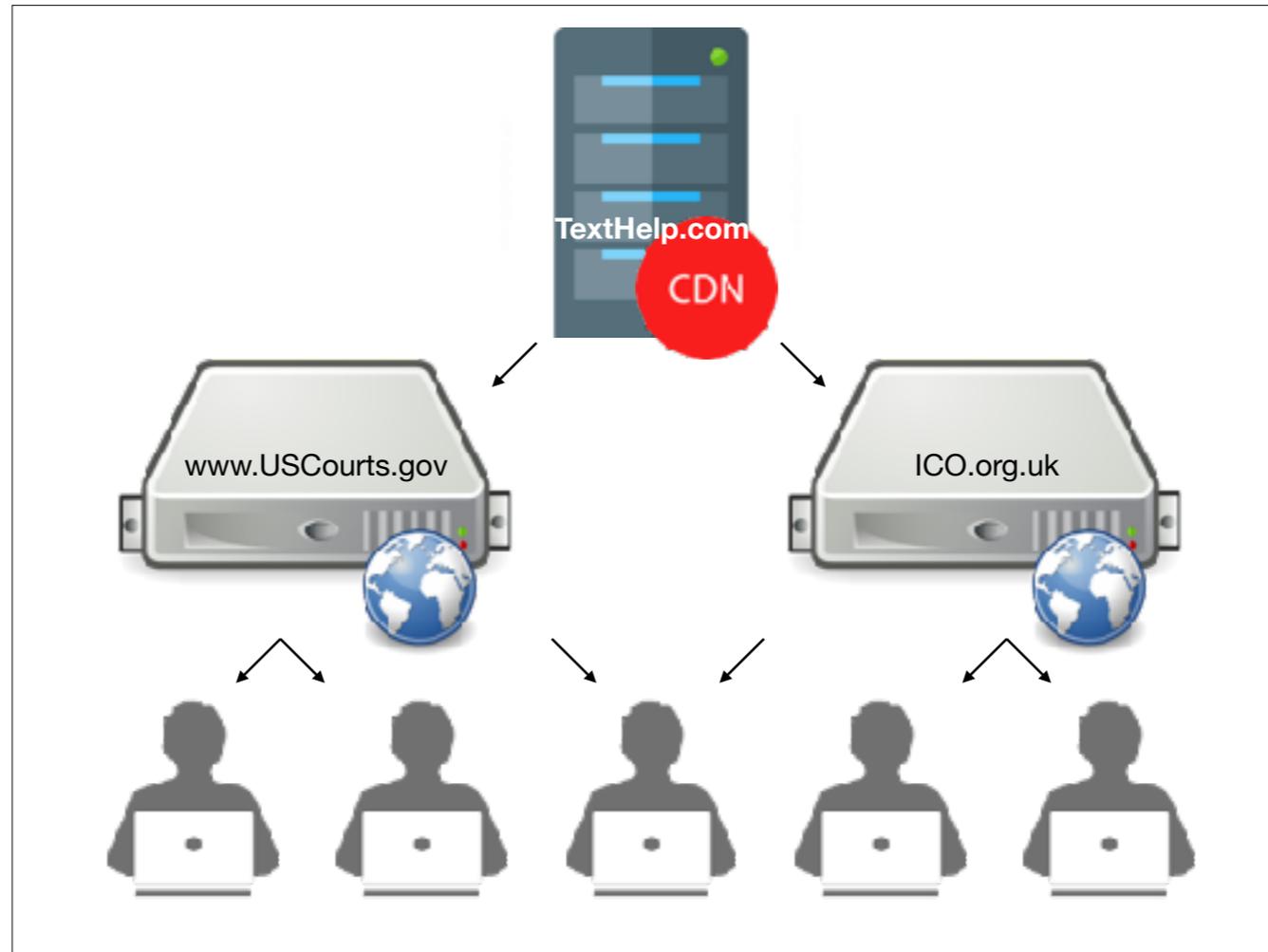
…that you want to run cryptocurrency mining JavaScript on hundreds of thousands of user's Web browsers. [BUILD] You don't have to attack thousands of websites to do this. You could compromise [BUILD] the one website all those other websites load files from. Instead of compromising USCourts.gov, and ICO.org.uk, you could compromise TextHelp.com, an assistive technology provider, which all those other websites load a JavaScript snippet from. Compromise TextHelp.com, and you can insert your crypto mining malware on every website that instructs users to load TextHelp's file. These aren't theoretical attacks, either. [NEXT]

Scott Helme @
@Scott_Helme

Ummm, so yeah, this is *bad*. I just had
@phat_hobbit point out that @ICOnews
has a cryptominer installed on their
site... 😮

5:46 AM · 11 Feb 2018

902 Retweets 915 Likes

💬 52   🔁 902   ♡ 915

Source: https://twitter.com/Scott_Helme/status/962684239975272450

This exact situation, with ICO News and USCourts.gov as examples, happened just last week. It's exactly the sort of scenario Subresource Integrity is designed to mitigate. Let's see how you can prevent this attack against your site's users… [NEXT]

Subresource Integrity Manager (for WordPress)

Demo time!

…with the Subresource Integrity Manager for WordPress.
[SWITCH TO DEMO, then…]
Some quick pro-tips for using SRI effectively:… [NEXT]

Subresource Integrity Pro-tip

Generate SRI hashes for subresources not added via wp_enqueue_*() functions: https://www.SRIHash.org/

SRI Hash Generator

Enter the URL of the resource you wish to use:

`https://cdn.datatables.net/1.10.16/js/jquery.dataTables.min.js?ver=4.9.4` [Hash!]

```
<script src="https://cdn.datatables.net/1.10.16/js/jquery.dataTables.min.js?ver=4.9.4" integrity
="sha384-Z9D45cp3elqajO+xXyjRTIKlGr3eYaXiyCPIKNog1eIQzpo2fqrDqrdAIXGiJjzOv" crossorigin="anonymou
s"></script>
```

SRIHash.org is an easy way to generate one-off HTML elements such as <script> that include SRI metadata attributes. You may need this if a particular plugin or resource isn't being added to your site via the provided WordPress functions. [NEXT]

Subresource Integrity
Pro-tip

Add Content Security Policy (CSP) HTTP header values:
`Content-Security-Policy: require-sri-for script;`
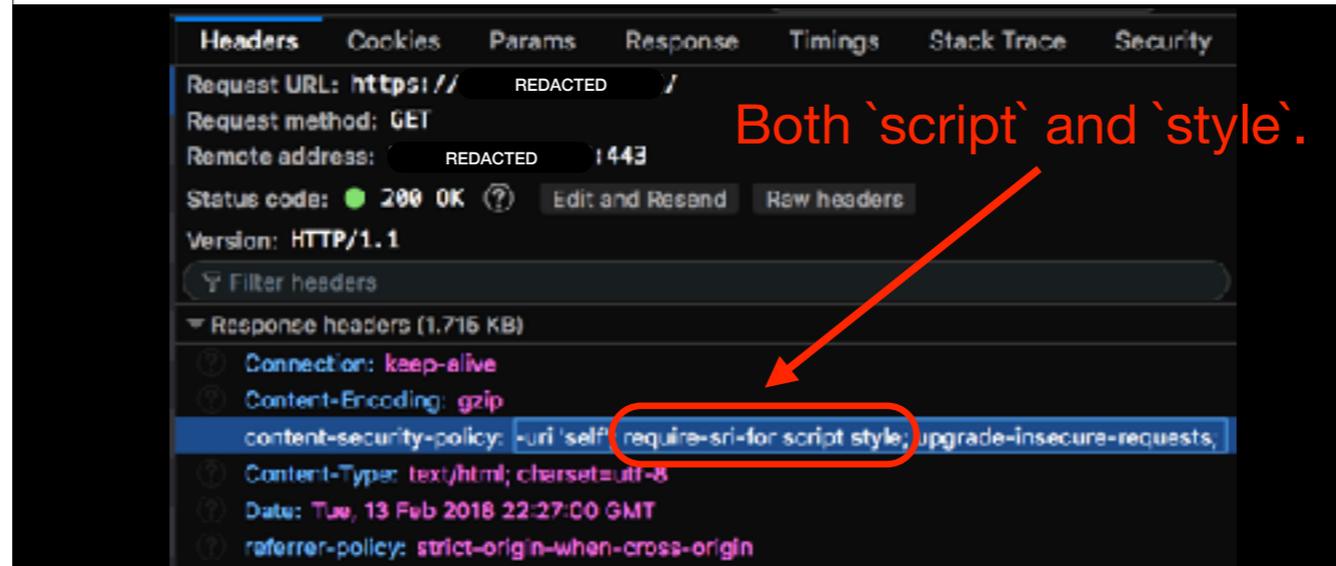
You can further harden your website's security posture by implementing Content Security Policy HTTP headers. In the header, include the value `require-sri-for script style;` to tell your visitors's Web browsers not to fetch any resource that doesn't include a valid SRI metadata attribute. [NEXT]

Subresource Integrity Pro-tip

- Support in Web development frameworks is evolving:

  - Ruby on Rails via `sprockets-rails` gem:

    ```
    javascript_include_tag :app, integrity: true
    ```

  - Node.js via NPM's `ssri` package:

    ```
    const integrityObj = ssri.fromData('foobarbaz', {
      algorithms: ['sha256']
    });
    integrityObj.toString('\n');
    // -> sha256-l981iLWj8kurw4UbNy8Lpxqdzd7UOxS50Glhv8FwfZ0=
    ```

Finally, you don't have to be using WordPress to use SRI features. Since the Free and Open Web is by intent and design a platform-agnostic technology, you can use SRI features regardless of which development platform you choose to use. [BUILD] If you're building with Ruby on Rails, use the `sprockets-rails` gem. [BUILD] If you're using any of the Node.js tools, pick up the `ssri` package. [NEXT]

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…Subresource Integrity Manager for WordPress.

Any quick questions on SRI metadata or implementation before we move on to my OpenPGP plugin? [PAUSE, WAIT FOR AUDIENCE FEEDBACK, then…]

Okay then, moving on… [NEXT]

GPG/OpenPGP signing and encryption (for WordPress)

…to GPG/OpenPGP signing and encryption for WordPress. First,… [NEXT]

"GPG/OpenPGP"?

…how many of you already know what GPG or (Open)PGP refers to? [PAUSE FOR AUDIENCE PARTICIPATION]
The short answer to this question is that GPG or OpenPGP is basically… [NEXT]

…"secured email." But, here, we need to be careful [BUILD] about what "secured" means. In a VERY brief nutshell, when InfoSec pros talk about "security," they're usually speaking about what's known as… [NEXT]
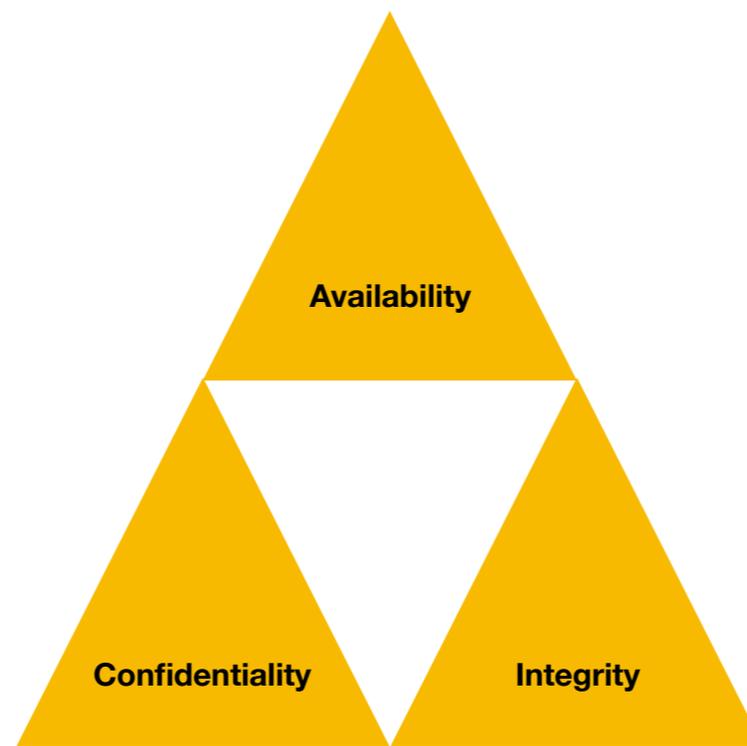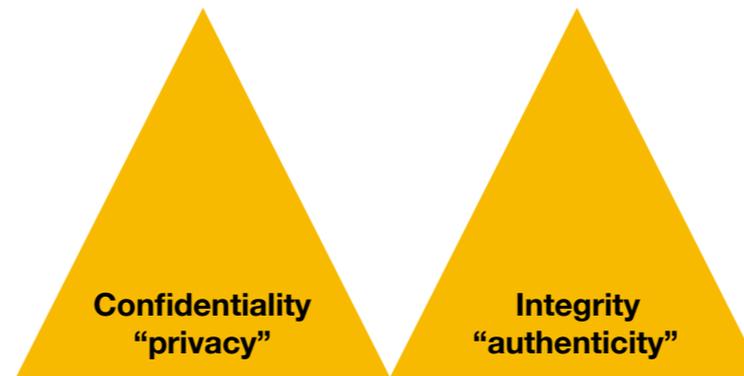
InfoSec's "CIA Triad."

(aka. "the Triforce of Security.")

…the "CIA triad." It's called a "triad" because [BUILD] it has three parts. These are: [BUILD]

* Confidentiality, [BUILD]
* Integrity, [BUILD], and
* Availability.

Now, for the purposes of this session, we're only going to concern ourselves… [NEXT]
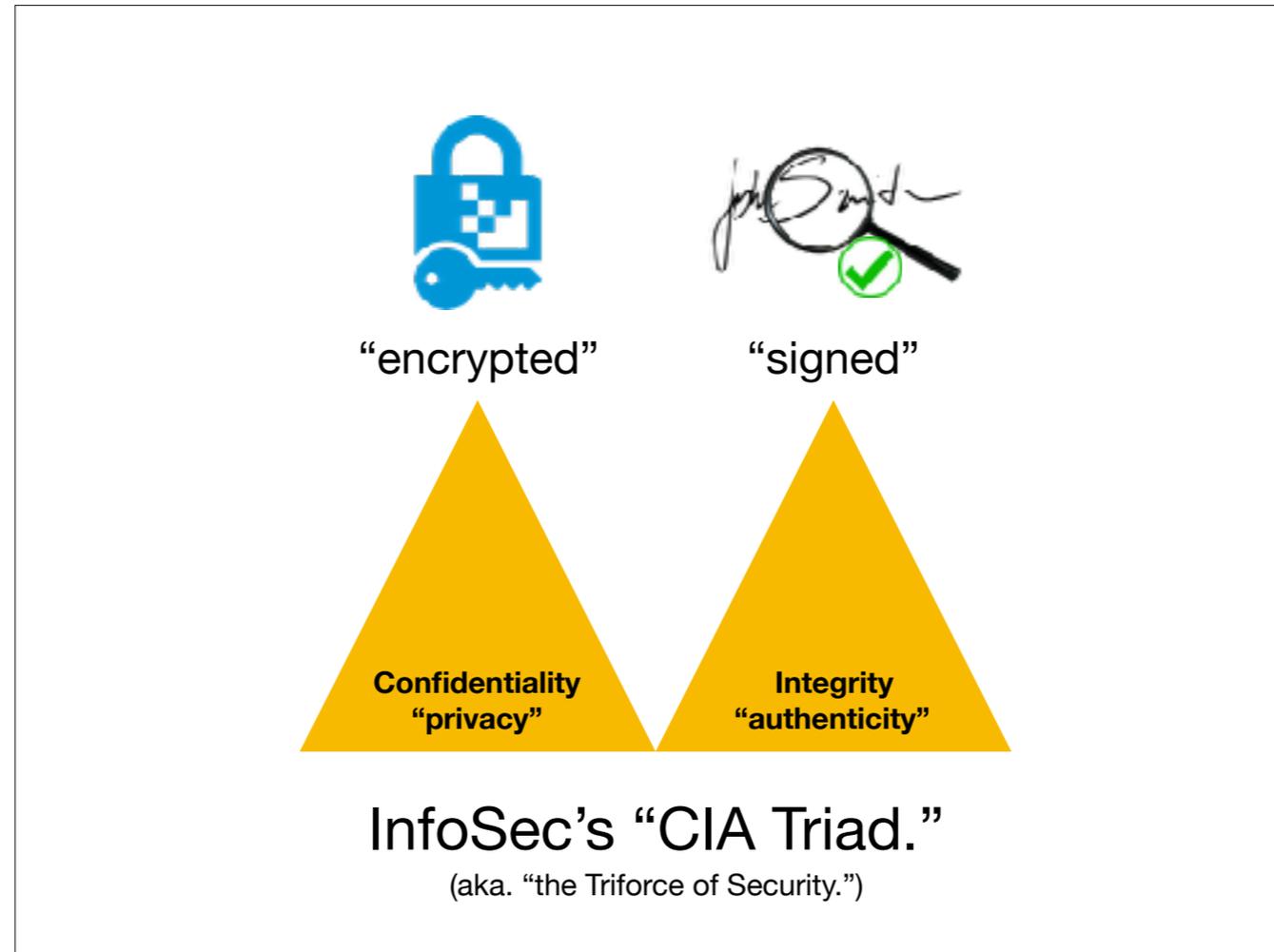
InfoSec's "CIA Triad."

(aka. "the Triforce of Security.")

…with the first two pieces of this triad.

Another common word for the property of "Confidentiality" [BUILD] is "privacy."

Likewise, another word for a very important aspect of "Integrity" [BUILD] is "authenticity."

So, in the next demo, when I talk about… [NEXT]

…GPG *encryption*, what I'm talking about is ensuring privacy: the ability for your website to send a message that only its intended recipient can read.

When I talk about [BUILD] GPG *signing*, what I'm talking about is ensuring authenticity: the ability for the recipient of that message to verify that the message they received was *actually sent by* your website, and that the message they got is an *unmodified copy* of the message that was sent.

Now let's see how you can accomplish this… [NEXT]

GPG/OpenPGP
signing and encryption
(for WordPress)

# Demo time!

…with the WP PGP Encrypted Emails plugin I wrote.

[SWITCH TO DEMO, then…]

Some quick pro-tips for making even more use of the WP PGP Encrypted Emails plugin:… [NEXT]

WP PGP Encrypted Emails Pro-tip

Zero-configuration, out-of-the-box WooCommerce support, offering "secured email receipts" for customers who opt-in.

Source: https://floraposidonia.xyz/2017/12/16/flora-posidonia-now-offers-secured-e-mail-receipts/
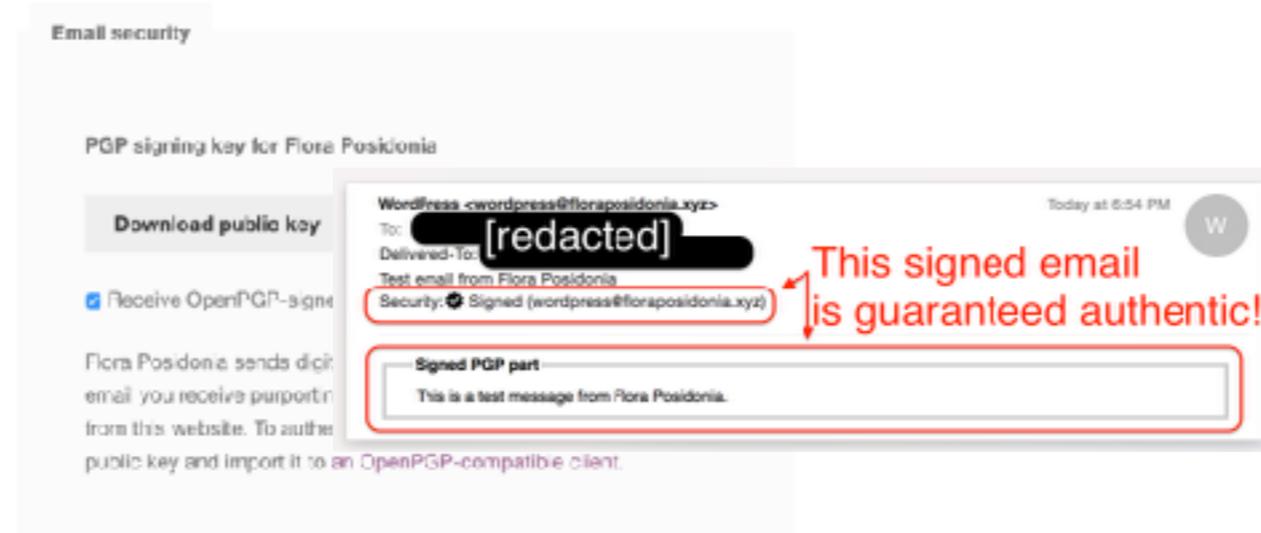
Importantly, WP PGP Encrypted Emails features a zero-configuration, out-of-the-box integration with WooCommerce, the most popular e-commerce plugin for WordPress. As long as your chosen WordPress Theme supports WooCommerce's customer account pages, [BUILD] merely installing WP PGP Encrypted Emails gives your customers an out of the way form with which they can opt-in to receiving PGP signed emails, or even encrypted emails, if they choose to upload their PGP public key to their customer profile page. [BUILD] This is an example of what a signed email might look like for a customer using Apple's Mail.app. [NEXT]

WP PGP Encrypted Emails
Pro-tip

A general-purpose API to cryptographic operations using familiar WordPress filter hooks:

```php
<?php
// Get the key material.
$wp_user    = get_user_by( 'email', 'example.user@example.com' );
$public_key = apply_filters( 'wp_openpgp_user_key', $wp_user );
$smime_cert = apply_filters( 'wp_smime_user_certificate', $wp_user );

// Compose a message to encrypt.
$message = 'This is a test.';

// Do the encryption.
$pgp_encrypted_message   = apply_filters( 'openpgp_encrypt', $message, $public_key );
$smime_encrypted_message = apply_filters(
    'smime_encrypt', $message, array(), $smime_cert
); //< Empty `array()` means no extra MIME-formatted headers.
```

Source: https://github.com/meitar/wp-pgp-encrypted-emails#openpgp-api

For developers, WP PGP Encrypted Emails features a general-purpose API to cryptographic operations using the familiar WordPress plugin API. Internally, [BUILD] the plugin uses the same filter hooks as it makes available to other plugins. [BUILD] This means that with as few as four lines of PHP, [BUILD] developers can build PGP or S/MIME encryption into their own plugins and themes. [NEXT]

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…GPG/OpenPGP signing and encryption for WordPress.

Any quick questions on OpenPGP at this point? [PAUSE, WAIT FOR AUDIENCE FEEDBACK, then…]

Okay then, moving on… [NEXT]

Centralized Authentication Service (OpenLDAP for WordPress)

…to Centralized Authentication Service using OpenLDAP for WordPress. As before,… [NEXT]

"Centralized Authentication Service"?
"OpenLDAP"?

…has anyone here heard of either "Centralized Authentication Service" or "OpenLDAP" before? [PAUSE FOR AUDIENCE PARTICIPATION]
Let's start with "LDAP." LDAP is an initialism… [NEXT]

OpenLDAP
(Lightweight Directory Access Protocol)

- Open, vendor-neutral, industry standard application protocol for accessing and maintaining distributed directory information services.

  - "Directory information services" (for us) means *account login data*.

…that stands for the Lightweight Directory Access Protocol. It is an [BUILD, READ FIRST BULLET, then…] What that means [BUILD] for our purposes at the moment, is that an LDAP database, which we call a "Directory Information Tree" or a DIT, can store user account login details, such as usernames, email addresses, and passwords in an application-independent way, so that any LDAP-capable application can use the LDAP DIT *as* its user database. More on that in a minute. [NEXT]

OpenLDAP
(Lightweight Directory Access Protocol)

- Open, vendor-neutral, industry standard application protocol for accessing and maintaining distributed directory information services.

  - "Directory information services" (for us) means *account login data*.

- Co-created by Tim Howes, circa 1993, CTO and founder of Loudcloud/Opsware, Inc.

Fun fact: the LDAP specification was written by Tim Howes circa 1993, who soon thereafter co-founded a company named LoudCloud with Marc Andreesen. That company later became Opsware, Inc., where I worked as a Consulting Engineer. It was then acquired by Hewlett Packard, and one product for which I was a specialist, Opsware SAS, or the "Opsware Server Automation System," was rebranded as HP Data Center Automation. It is now sold as part of the HP Server Automation, or HPSA, software suite.

Now, let's take a step back and talk about how a small business's network might work without LDAP. [NEXT]

So, you have a website running WordPress, let's call it YourSite.com. One of your users, [BUILD] let's call them Alice, [BUILD] logs in to the site. To successfully log Alice in, WordPress first checks its `wp_users` table [BUILD] for an entry matching Alice's account credentials. If they exist and match what was submitted [BUILD], then Alice is successfully logged in. In this setup, the user's account information is stored in WordPress, by WordPress, and is only intended to be accessible to your WordPress-powered site. We can say that your user data is application-specific.
Now let's imagine that you want to add another application to your network,… [NEXT]
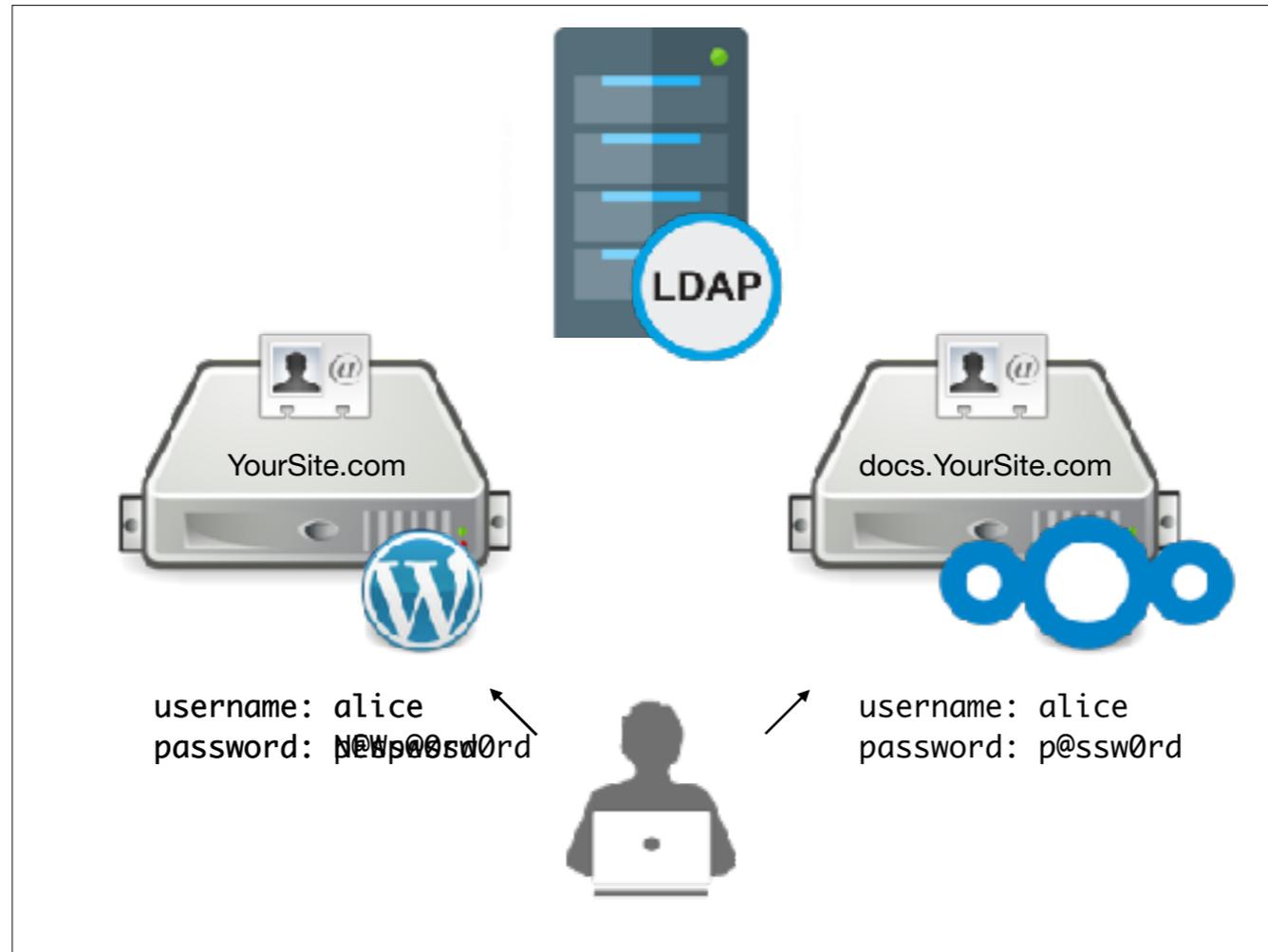
…such as Nextcloud. You could, and most organizations I've ever encountered simply do, tell Alice that they now have two user accounts. They have one account for WordPress, [BUILD] and a completely separate account for Nextcloud. [BUILD] In my experience, this causes a lot of problems. Among other issues, it means users [BUILD] must manage two login accounts, two passwords, and two user profiles. Most users will at first choose the same username and the same password for multiple systems. When they later change their password in one system, [BUILD] the other system is not informed of the change, and confusion—not to mention help desk tickets —ensue. This is a classic problem [BUILD] that LDAP can solve. With an LDAP server,… [NEXT]
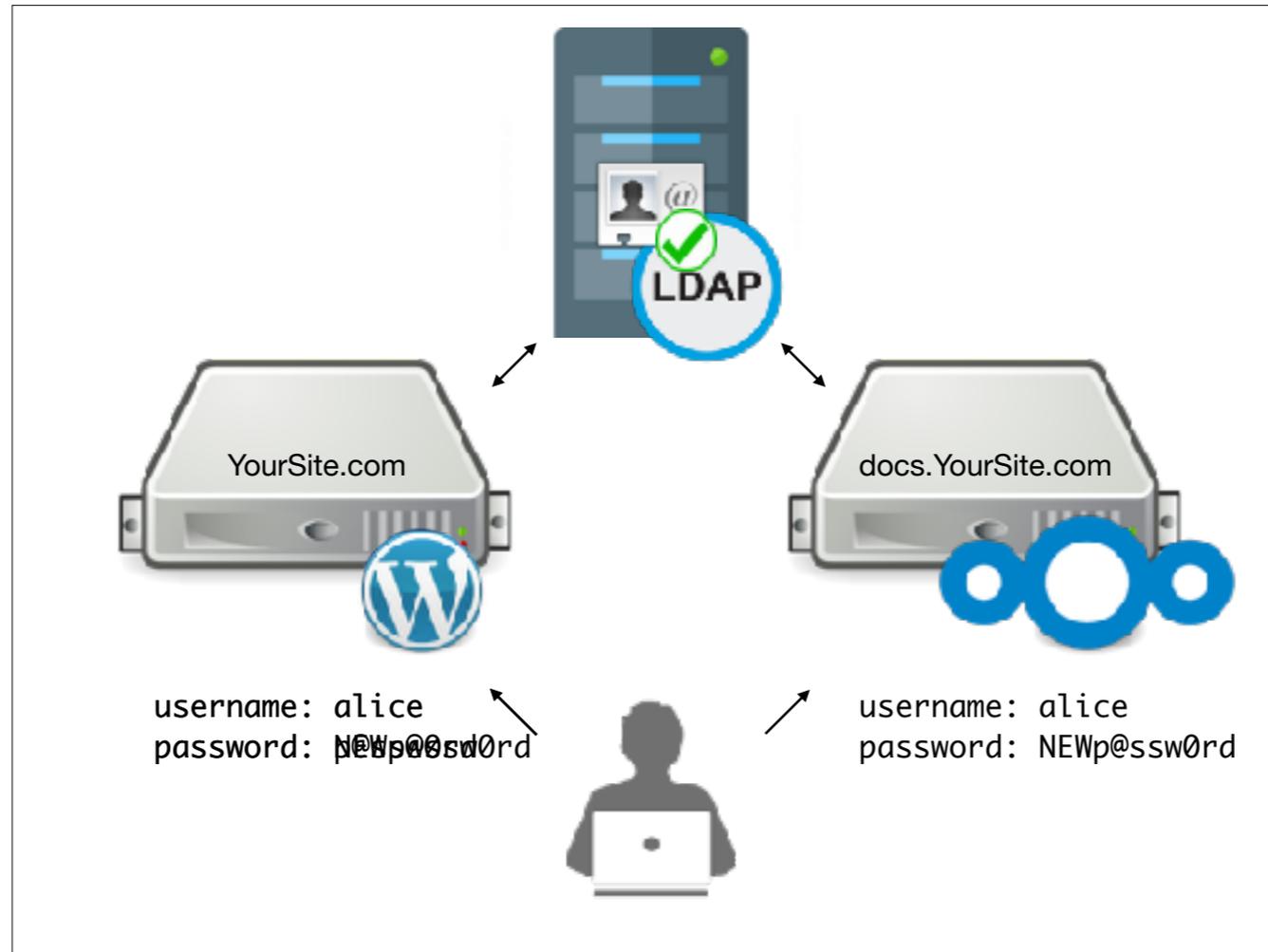
…you can store account details in such a way as to provide a Centralized Authentication Service (CAS) for any LDAP-capable application you choose to add to your network. Now, [BUILD] regardless of which app server Alice logs in to, their account credentials are always the same. When they [BUILD] change their password using WordPress, they can immediately [BUILD] use their new password to log in to Nextcloud, because the authentication check [BUILD] happens in one, central place: the LDAP server.

All right, let's see how you can configure a setup like this… [NEXT]

Centralized Authentication Service (OpenLDAP for WordPress)

Demo time!

…with the WP-LDAP plugin I wrote.

[SWITCH TO DEMO, then…]

Finally, some quick notes on the WP-LDAP plugin: [NEXT]

WP-LDAP Pro-tips

- Built-in support for WordPress Multi-network installs; provide different LDAP servers for different WP Networks.

- Out-of-the-box support for propagating a user's S/MIME public certificate provided to WP PGP Encrypted Emails.

- Creates `inetOrgPerson` entries for compatibility with all RFC2798-compliant LDAP consumers like Apple Contacts, Microsoft Outlook, and Mozilla Thunderbird Address Book.

WP-LDAP supports WP Multi-network installs, not just Multi*SITE* installs. This means you can configure different LDAP servers for different WP Networks. You might want to do this for network segmentation, or perhaps load balancing, it's really up to you. [BUILD] The plugin is also already aware of WP PGP Encrypted Emails's S/MIME public certificate field, so if you use both plugins in one WordPress install, you can get transparent S/MIME-based email security in clients that support it, such as on properly configured iPhones. [BUILD] All of this is, of course, RFC 2798 compliant, so you can further use WP-LDAP to offer people directory services to various LDAP consumers like Apple Contacts, Microsoft Outlook, Mozilla Thunderbird's Address Book, and so on. [NEXT]

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…a Centralized Authentication Service using OpenLDAP for WordPress.
Do we have time…[NEXT]

Questions and
(hopefully some) Answers

…for questions and answers?
[PAUSE FOR AUDIENCE PARTICIPATION]
All right, so lastly, in case it wasn't clear… [NEXT]

Get the plugins

- Subresource Integrity Manager for WordPress:
  https://wordpress.org/plugins/wp-sri

- WP PGP Encrypted Emails:
  https://wordpress.org/plugins/wp-pgp-encrypted-emails

- WP-LDAP:
  https://wordpress.org/plugins/wp-ldap

…all of my plugins are in WordPress.org's plugin repository. Here are their permalinks. [NEXT]

THE INFORMATION AGE EQUIVALENT OF JOHNNY APPLESEED

Hi, I'm Maymay. (Download my digital business card.)

I am a free software developer and technology consultant and I work without money. Instead of owning a home, I live on the road, so that I can travel to do Good Work with Good People for the benefit of our future. I've been called the "Information Age equivalent of Johnny Appleseed."

In my former life, I was a software engineer and consultant for Fortune 100 companies such as Hewlett Packard and Lehman Bros. But I hated those jobs and I wanted to make a difference in the world instead of helping bankers line their pockets, so I quit corporate America in 2007. I've been freelancing ever since.

Are you trying to make a difference, too? Do you have a project that needs a skilled programmer? Are you looking to make a bigger impact through wide exposure? My projects generally make the news. Pique my interest, and I will come to you.

Projects I have worked on recently include:

- **Buoy: A community-based crisis response system**
  A free software, decentralized platform for emergency response that offers an alternative to 911. Because friends don't let friends call the cops.
    - A World Without Police: Buoy, a Web App that Builds Autonomy
    - TWiT.tv's FLOSS Weekly, episode 385: Buoy
    - People of Interest, February 8th, 2017 (MP3) (starts at 35:23)
    - Newscastic: 7 Albuquerque-Made Apps That Will Change the World

Source: maymay.net

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Thank you very much for your time and attention.