



Hop Studios

BUT FIRST...

...

Parse Order in ExpressionEngine's Templates

Introduction: Who am I?

Rowan Sentesy

Self-taught (mostly)

~12 years EE experience

Entrepreneur

Freelance

Now: developer with Hop Studios



Introduction: Overview

What we're going to talk about:

1. What is Parse Order?
 2. Hop's EE6 Parse Order PDF
 3. Parse order problems
 4. PHP in Templates
 5. Examples
 6. Q&A
-



EE Templating

- Powerful
 - Elegant
 - Easy to get quick results
 - Simple things are .. simple!
 - Complexity
 - Snippets
 - Addons
 - Variables
 - Caching
-



What is Parse Order?

```
{stuff} => <html>..</html>
```

Parse & Render

Tags are rendered, can be used later in the process.

Order is important



Let's see what EE has to say...

© THE TEMPLATE ENGINE



Can we change parse order?

Yes ... Kind-of ...



Example 1 - Default (Outward)

```
<h1>Default (outward)</h1>

{exp:rss_parser

url="https://ellislab.com/blog/rss-feed" limit="5"}

<ul>

  {feed_items}

    <li><a href="{item_link}">{item_title}</a><br />

      {exp:word_limit total="35"}

        {item_content}

      {/exp:word_limit}

    </li>

  {/feed_items}

</ul>

{/exp:rss_parser}
```



Default (outward)

- [EEConf Spring Summit - Ticket Scholarships](#)

Following in the steps of our friends at [LaraconScholarship](#), we're happy to announce that ExpressionEngine and [EEConf](#) are working together to find those in our community who would like to attend the EEConf Spring Summit, but can't afford it. We're primarily focusing on members of demographic groups that are traditionally underrepresented at tech conferences.

If you're interested in joining us and the rest of the EE Community, please follow the link below to submit the scholarship request form. If approved, you will be sent a special link to use for your registration.

[Apply For Scholarship](#)

- [ExpressionEngine Support Now Includes EEHarbor Add-ons](#)

ExpressionEngine support has always been known for its fast response times and reliable results. Today we're happy to announce that the [ExpressionEngine Support](#) plans will also cover all [EEHarbor](#) add-ons.

How do I use it?

If you have an existing support plan for ExpressionEngine, you can now submit support tickets for any EEHarbor add-ons as well, right from your support portal!

What's the difference?

Tickets for EEHarbor add-ons submitted through the official ExpressionEngine Support system will fall into the same response timelines as your support plan. In addition to this, you get the same depth of support for EEHarbor add-ons as you would for your ExpressionEngine installs, including logging into your install or server if need be.

Support Plans

Direct, fast, unlimited support from the same team that builds your favorite CMS.

Emerald Small Agencies & Freelancers	Sapphire Mid-Sized Teams & Busy Sites	Diamond Enterprise & Larger Agencies
\$99 /month Save 20% when paid annually	\$199 /month Save 20% when paid annually	\$499 /month Save 20% when paid annually
Fast 1 business day response time 1 urgent ticket per month	Faster 4 hour response time 5 urgent tickets per month	Fastest 1 hour response time Every ticket is urgent!
5 tickets per month Support for all EEHarbor add-ons	Unlimited Support Support for all EEHarbor add-ons Extended Business Hours	Unlimited Support Support for all EEHarbor add-ons Extended Business Hours Weekend Response
Choose Plan →	Choose Plan →	Choose Plan →

Example 2 - Inward

```
<h1>Inward</h1>
{exp:rss_parser
url="https://ellislab.com/blog/rss-feed" limit="5"
  parse="inward" }
  <ul>
    {feed_items}
      <li><a href="{item_link}">{item_title}</a><br />
        {exp:word_limit total="35"}
          {item_content}
        {/exp:word_limit}
      </li>
    {/feed_items}
  </ul>
{/exp:rss_parser}
```

Inward

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How do I...

- [90-Day Plan](#)

At the end of 2020 we released ExpressionEngine 6, and with it we ushered in the start of a new era in the ExpressionEngine world. Today in collaboration with our [partners](#) we're happy to...

- [ExpressionEngine University Update](#)

Today we're pleased to announce the first course added to ExpressionEngine University, [a 15 part video course by Doug Black](#). Each lesson in the course has a corresponding forum thread that can be used...

- [ExpressionEngine 6.0.1 Release](#)

It's been great to see the response to the ExpressionEngine 6.0 release. We've also been very pleased with the stability of the initial release. We feel it's only appropriate to say a great big THANK...



Example 3 (bonus)

```
<h1>Outward with :limit</h1>

{exp:rss_parser
url="https://ellislab.com/blog/rss-feed" limit="5"}

<ul>
  {feed_items}
    <li><a href="{item_link}">{item_title}</a><br />
      {item_content:limit characters="210"}
    </li>
  {/feed_items}
</ul>

{/exp:rss_parser}
```

Outward with :limit

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Extension Hook Priority

Two hooks for template parsing:

1. `template_fetch_template`
2. `template_post_parse`

`priority` - an extension hook could have many extensions being called, so there needs to be priority. 1 => First, 10 => common default, 99+ => Last.

Think: z-index for timing.



The Big Ones

my list

- Module & plugin tags
 - Variables (single, pair)
 - Conditional tags
 - Site Template Variables
 - Template Partials
 - The variables formerly known as 'snippets'
 - Template Layout tags
 - Embeds
 - PHP Code
-



Thanks to Low

Kudos to @Low for this EE 2 Parse order document!

Back in 2010, Low created this document.

Lodewijk Schutte (aka @Low)



ExpressionEngine's Parse Order

In what order does EE parse its variables and tags?

Read URI to determine template

Get template from DB, check permissions & authentication

Get template from file

Return static template

1. Parse snippets / global variables, segment variables and embed variables *

Parse date string constants

Parse {template_edit_date} and {current_time}

If present, get cached template, then go to #7

2. Parse PHP on Input

3. Parse simple conditionals: segment, embed, global variables

4. Assign and parse preload_replace variables

5. Parse module and plugin tags

6. Parse PHP on Output

Write cache file

7. Parse advanced conditionals

8. Process embedded templates

Redirect

9. Parse User Defined global variables and others:

{hits}	{gzip_mode}	{group_title}
{ip_address}	{app_version}	{member_group}
{ip_hostname}	{version}	{username}
{homepage}	{app_build}	{screen_name}
{cp_url}	{build}	{email}
{site_name}	{charset}	{ip_address}
{site_url}	{lang}	{location}
{site_index}	{doc_url}	{total_entries}
{webmaster_email}	{member_profile_link}	{total_comments}
{stylesheet}	{captcha}	{private_messages}
{encode}	{member_id}	{total_forum_posts}
{path}	{group_id}	{total_forum_topics}
{debug_mode}	{group_description}	{total_forum_replies}

Done!

**) In EE1, segment vars are parsed first, then embed vars, then path.php / global vars.*

Introducing the ... EE Parse Order Quick Reference Guide

hopstudios.com/parse_order



ExpressionEngine Parse Order - Quick Reference Guide

- i. Read URI get template
- ii. Get template, check permissions & authentication
- iii. Get template ^A (from file if exists) ↓ Hook Here: `template_fetch_template`
- iv. "Static" templates are served "as-is"; ditto for templates that EE knows COULD be static

1. **site** variables (*template partials, global_vars*) ^{ABC}
2. **{if in_group()}** conditionals ^E
3. **{segment_*}** segment variables
4. **{segment: *}** template route segment variables
5. **{embed: }** variables (*only if template called as an embed*)
6. **{layout: }** variables (*only if template has a layout tag*)
7. **{errors}** **{/errors}** and error conditionals
8. **Date** string constants such as **{current_time format=" {DATE_ATOM} "}**
9. **Date** variables **{template_edit_date}** **{current_time}** **{variable_time}**
10. **{consent: }** variables
11. **Caching ...** If this template is cached, skip ahead to #18
12. **<?php ?>** (on input)
13. **{if .. }{/if}** Conditionals (*if variables are available*) ^F
14. **{preload_replace}** variables
15. **{exp: }** tags - Outside to Inside ^{AFQHIJ}
16. **<?php ?>** (on output)
17. **Caching ...** If needed, write the mostly parsed template to cache
18. **{if .. }{/if}** Conditionals (*all remaining*) ^{FK}
19. **{layout=}** process the associated template (*this starts a new loop*)
20. **{embed=}** tags - process all (*each embed starts a new loop*)
21. **Clean up** unused **{layout: }** tags ↓ Hook here: `template_post_parse`
22. **{redirect=}** First remaining tag ^{JL}
23. **site** and **global** template variables (*no conditionals allowed*) ^M
24. Process **{stylesheet=}** **{encode=}** **{path=}** **{route=}**
25. **CSRF** add security hashes and **ACT** IDs
26. **Remove** any lingering EE comments ^A

```
{logged_in_*} {template_*}D
{is_*_request} {site_*}
{last_segment} {current_url}
{current_path} {current_query_string}
{webmaster_email}
```

Skip this if
using cached
template

- A. Any EE comments are removed at this step
- B. Partials (aka "snippets aka global_vars") will override variables with matching names, but everything is parsed at once, meaning one variable's output can't contain the name of another
- C. "global_vars" ≠ Global Template Variables
- D. But not **{template_edit_date}** because it might need to be formatted by step 8
- E. It's unclear how **{if in_group() }** works with "roles"
- F. Conditionals will get parsed here if all their variables exist
- G. Plugins (specifically plugins?) parse inside to outside unless you use `parse="inwards"`
- H. **{exp: }** tags in the parameters of another tag get parsed first in most cases
- I. **{search: }** tags on a search results page can also be used as a parameter of an **{exp: }** tag
- J. **{redirect=}** in a triggered **{if no_results}** tag pair fires immediately when it's parsed
- K. This is still called "advanced conditionals" in the code, but it's not just those specifically
- L. I'd prefer to redirect before parsing all sub-templates, but I'm sure there's a reason. Maybe so that you can redirect from an embed that's located in the main template before another redirect?
- M. This includes parsing the output of entry fields, which can mean slight variations in final output depending on your version of EE

Based on EE v6.0.3 /system/ee/legacy/libraries/Template.php

Prepared by Travis Smith & Rowan Sentesy of Hop Studios (@hopstudios) for #EECONF2021



Common problems with Parse Order

Variable name collision was a problem when nesting `{exp: }` tag pairs!

- `{count} {total_results} {no_results}`
would sometimes show unexpected results

Over the years this has become less of an issue, thanks to prefixing!

- `var_prefix` (i.e. Matrix)
- EE Relationships & Grid - full field name prefixing
`{relationship_field:my_relationship status="open"}...`



Prefixing: A Quick look

Generally, this works very well.

It is rare to encounter issues with this since Relationships & Grid were introduced by EE.

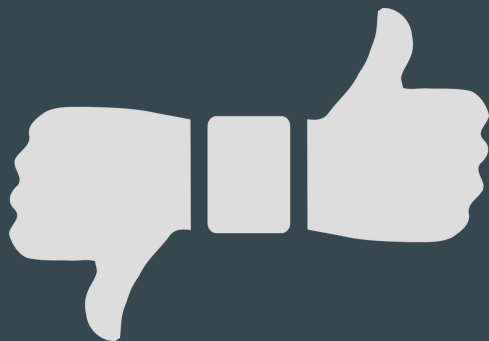
```
1 {exp:channel:entries channel="my_channel"}
2   {if count == 1}
3     <h1>Entries from my channel</h1>
4   {/if}
5
6   {!-- MATRIX WITH PREFIX --}
7   {my_matrix_field
8     var_prefix="spkr"}
9     {!-- Playa column --}
10    {spkr:favorite_bands}
11      {!-- Matrix field inside band channel --}
12      {albums var_prefix="albm"}
13        {spkr:row_count}. {albm:row_count}
14        {albm:album_title}
15      {/albums}
16    {/spkr:favorite_bands}
17  {/my_matrix_field}
18
19  {!-- RELATIONSHIP --}
20  {relationship_field}
21  <h2>Related entry's title: {relationship_field:title}</h2>
22
23  {relationship_field:my_relationship status="open"}
24  {if relationship_field:my_relationship:count == 1}
25    <h3>Relationships ({relationship_field:my_relationship:total_results})</h3>
26  {/if}
27
28  <h3>Related entry's related entry's title: {relationship_field:my_relationship:title}
29  </h3>
30
31  Related entry's file field, med custom image size:
32  {relationship_field:my_relationship:my_file:med wrap="image"}
33  {/relationship_field}
34
35
36  {if count == total_results}
37    No more entries
38  {/if}
39 {/exp:channel:entries}
```



Use PHP in templates

Don't do it!

- Experienced developer
- Use an existing Add-on
- Use an embed
- Security
- Performance
- Complexity
- Maintainability
- Time/Budget



Do it!

- Beginner or new to EE
- Can't solve with add-on
- Can't solve with embed
- Security
- Performance
- Simple to moderately complex
- Time/Budget



PHP not in EE (without add-on)

PHP to provide info about

- System, server, or client
- Functionality or data
- CURL
- Connect to another db

Example: file directory listing

```
1 <?php
2     $dir    = '/var/www/html/images';
3     $files1 = scandir($dir);
4     echo "<pre>";
5     print_r($files1);
6     echo "</pre>";
7 ?>
```

```
Array
(
    [0] => .
    [1] => ..
    [2] => .htaccess
    [3] => avatars
    [4] => captchas
    [5] => forum_attachments
    [6] => index.html
    [7] => pm_attachments
    [8] => signature_attachments
    [9] => smileys
    [10] => uploads
)
```



PHP Parse Stage

Parse stage: Input

Do some PHP feed results into EE module.

```
<?php
    /* Set an array */
    $entry_ids = [1,2,3,4,5];
?>
<!-- Use an array -->
{exp:channel:entries
entry_id="<?=implode("|",$entry_ids) ?>"}
    <h1>{title}</h1>
{/exp:channel:entries}
```

Parse stage: Output

Use EE module to build php variable/array.

```
<?php
    $data = [];
?>
{exp:channel:entries limit="100"}
    <?php
        $data[] = [{entry_id},{title}];
    ?>
{/exp:channel:entries}

<?php
    echo "<pre>";
    print_r($data);
    echo "</pre>";
?>
```



Problem: List & Total

Consider this example

How would you solve for...
Price total (numeric)
Emails (list)



Type it in the chat.



```
1 <h2>Starting point</h2>
2 {exp:channel:entries channel="purchases"}
3   {if count == 1}
4     <table>
5       <tbody>
6     {/if}
7     <tr>
8       <td>{purchaser_email}</td>
9       <td>{price}</td>
10    </tr>
11    {if count == total_results}
12    </tbody>
13    <tfoot>
14    <tr>
15      <td>Total</td>
16      <td><!-- TOTAL GOES HERE --></td>
17    </tr>
18    </tfoot>
19  </table>
20  {/if}
21 {/exp:channel:entries}
22
23 <h5>Emails</h5>
24 <!-- EMAILS GO HERE -->
25 <textarea></textarea>
```

Starting point

email4@email.com 25
email3@email.com 20
email2@email.com 20
email1@email.com 10
Total

Emails

Try without PHP (First try)

Requires: Stash, MX Calc

- Parsing not working
- MX Calc was not working with Stash

Totals & Lists with Stash & MX Calc - NOT OK

```
" }" }" }" }"  
email4@email.com 25  
email3@email.com 20  
email2@email.com 20  
email1@email.com 10  
Total 0
```

Emails (Stash) - OK

```
email4@email.com, email  
3@email.com, email2@ema
```

```
system > user > default_site > parse.group > ≡ totals_lists_stash.html  
1 {exp:stash:set_value name="total_price" value="0"}  
2 {exp:stash:set_value name="email_string" value=""}  
3  
4 <h2>Totals & Lists with Stash & MX Calc - NOT OK</h2>  
5 {exp:channel:entries channel="purchases"}  
6 {if count == 1}  
7 <table>  
8 <tbody>  
9 {/if}  
10 {exp:stash:set_value name="total_price"  
11 value="{exp:mx_calc parse='inward'  
12 expression='{exp:stash:get name=total_price} + {price}'"}  
13 }  
14 {exp:stash:append_value name="email_string" value="{purchaser_email},"}  
15 <tr>  
16 <td>{purchaser_email}</td>  
17 <td>{price}</td>  
18 </tr>  
19 {if count == total_results}  
20 </tbody>  
21 <tfoot>  
22 <tr>  
23 <td>Total</td>  
24 {exp:stash:parse process="end"}  
25 <td>{exp:stash:get name="total_price"}</td>  
26 {/exp:stash:parse}  
27 </tr>  
28 </tfoot>  
29 </table>  
30 {/if}  
31 {/exp:channel:entries}  
32  
33 <h5>Emails (Stash) - OK</h5>  
34 {exp:stash:parse process="end"}  
35 <textarea>{exp:stash:get name="email_string"}</textarea>  
36 {/exp:stash:parse}
```



Try without PHP (Second try)

Requires: Embed, Stash, Tally

Totals & Lists with Stash, Tally + embed - OK

email4@email.com	25
email3@email.com	20
email2@email.com	20
email1@email.com	10
Total	75.00

Emails (with Stash) - OK

```
email4@email.com,email  
3@email.com,email2@ema
```

```
system > user > templates > default_site > parse.group > ≡ totals_lists_stash_tally_embed.html
1   {exp:stash:set_value name="email_string" value=""}
```

```
2
3   <h2>Totals & Lists with Stash, Tally + embed - OK</h2>
4   {exp:channel:entries channel="purchases"}
5     {if count == 1}
6       <table>
7         <tbody>
8           {/if}
9           {exp:tally:add collection="total_price" value="{price}" count="{count}"}
10          {exp:stash:append_value name="email_string" value="{purchaser_email},"}
11          <tr>
12            <td>{purchaser_email}</td>
13            <td>{price}</td>
14          </tr>
15          {if count == total_results}
16            </tbody>
17            <tfoot>
18              <tr>
19                <td>Total</td>
20                <td>{embed="parse/_total_price"}</td>
21              </tr>
22            </tfoot>
23          </table>
24        {/if}
25      {/exp:channel:entries}
26      <h5>Emails (with Stash) - OK</h5>
27      {exp:stash:parse process="end"}
28      <textarea>{exp:stash:get name="email_string"}</textarea>
29      {/exp:stash:parse}
```

≡ _total_price.html ×

system > user > templates > default_site > parse.group > ≡ _total_price.html

```
1   {exp:tally:total collection="total_price"}
```



Try with PHP

Requires: PHP (output)

Totals & Lists with PHP (Output) - OK

email4@email.com	25
email3@email.com	20
email2@email.com	20
email1@email.com	10
Total	75

Emails

```
email4@email.com, email3@email.com,  
email2@email.com, email1@email.com,
```

system > user > templates > default_site > parse.group > totals_lists_php.html

```
1  <?php
2  $total_price = 0;
3  $email_string = "";
4  ?>
5
6  <h2>Totals & Lists with PHP (Output) - OK</h2>
7  {exp:channel:entries channel="purchases"}
8  {if count == 1}
9  <table>
10 <tbody>
11 {/if}
12 <?php
13     $total_price += {price};
14     $email_string .= "{purchaser_email}, ";
15 ?>
16 <tr>
17     <td>{purchaser_email}</td>
18     <td>{price}</td>
19 </tr>
20 {if count == total_results}
21 </tbody>
22 <tfoot>
23 <tr>
24     <td>Total</td>
25     <td><?=$total_price?></td>
26 </tr>
27 </tfoot>
28 </table>
29 {/if}
30 {/exp:channel:entries}
31
32 <h5>Emails</h5>
33 <textarea><?=$email_string?></textarea>
```



List & Total: Conclusions

Which do you like the best?

- Embeds, addons can be used
 - Can be fiddly & confusing
- PHP example is simplest, cleanest code (IMHO)



BUT FIRST...

Summary

- What is Parse Order?
- Hop's EE6 Parse Order PDF
- Old Parse order problems
- PHP in Templates
- Examples



Q&A

Ask in the Q&A tab,

or follow the instructions provided by
EE Conference team...



Thank you!



Hop Studios

Thanks to the EE Team:
Tom, Brian, Andy (and others!)

Reach out:

rowan@hopstudios.com

EE Slack: [@Rowan Sentesy](#)

www.hopstudios.com

Parse Order PDF:

www.hopstudios.com/parse_order
