JavaScript PersistentArrayBuffer

The **PersistentArrayBuffer** object is used to represent a persistent, fixed-length raw binary data buffer. The term "persistent" means that the buffer is put in **persistent memory**, which maintains its contents across power failure. Just like **ArrayBuffer**, you cannot directly manipulate the contents of an **PersistentArrayBuffer**; instead, you create one of the typed array objects or a **DataView** object which represents the buffer in a specific format, and use that to read and write the contents of the buffer.

Syntax

```
new PersistentArrayBuffer(length, path, mode)
```

Parameters

- **length**

  The size, in bytes, of the persistent array buffer to be created or opened.

- **path**

  The absolute path of the file to be mapped

- **mode**

  mode could be "c" or "o":

  - "c": create a file of size **length** in **path**, and map it to memory. The content is initialized to 0. If the file already exists, the operation would overwrite the original file.
  - "o": open a file in **path**, and map it to memory. In this situation, the parameter **length** should be zero, and the actual byte length of the persistent array buffer would be the length of the file.

Return Value

A new PersistentArrayBuffer object of the specified size.

Exception

- A **RangeError** is thrown when the **length** is larger than Number.MAX_SAFE_INTEGER (>= 2 ** 53) or negative
- A **PmemError** is thrown when failing to create PersistentArrayBuffer instances.

Description

The PersistentArrayBuffer constructor creates a new ArrayBuffer of the given length in bytes.

Properties

- **PersistentArrayBuffer.length**

  The **PersistentArrayBuffer** constructor's length property whose value is 1.

- **get PersistentArrayBuffer[@@species]**

  The constructor function that is used to create derived objects.

- **PersistentArrayBuffer.prototype**

  Allows the addition of properties to all **PersistentArrayBuffer** objects.

Instances

All **PersistentArrayBuffer** instances inherit from **PersistentArrayBuffer.prototype**.

Properites

- **PersistentArrayBuffer.prototype.constructor**

  Specifies the function that creates an object's prototype. The initial value is the standard built-in PersistentArrayBuffer constructor.

- **PersistentArrayBuffer.prototype.byteLength** (Read only)

  The size, in bytes, of the buffer. This is established when the array is constructed and cannot be changed. Read only.

- **PersistentArrayBuffer.prototype.msync(offset, length)**

    - Make buffer persistent. The parameters **offset** and **length** are the offset and length in bytes of the memory to be flush.
    - Throw **RangeError** when **offset** + **length** > actual length of **PersistentArrayBuffer**

- Notice that GC is in charge of the destruction of **PersistentArrayBuffer** instances, which would do the unmap operation. So no explicit API is needed for developer to unmap the buffer.

See also

- TypedArray
- ArrayBuffer

Example

```
try {
    var pab = new PersistentArrayBuffer(128, "/path/to/file", "c");
    // PersistentArrayBuffer instance cannot be directly manipulated. Instead, use
TypedArray to read or write the buffer contents
    var pab_uint8 = new Uint8Array(pab);
    // Initialize the contents to be 1
    for (var i=0; i<pab_uint8.length; ++i){
        pab_uint8[i] = 1;
    }
    //flush changes to the file
    pab.msync(0, 128);
}
catch (error){
    if (error instanceof RangeError) {
        throw new RangeError('length out of range');
    }
}
```

TODO

- Enable constructing **ArrayBuffer** by **PersistentArrayBuffer** (constructing **ArrayBuffer** a nd copy the data from **PersistentArrayBuffer**) and provide efficient copy semantic for **PersistentArrayBuffer** to copy data from **ArrayBuffer** or other **PersistentArrayBuffer**

- Implement **SharedPersistentArrayBuffer** according to **SharedArrayBuffer**, which can be shared between workers.
- Add "create but no initialize" mode to **PersistentArrayBuffer** constructor.