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    4856 Sun Feb  5 13:41:02 2017
new/usr/src/man/man9f/vmem_create.9f
more copy-editting from Josh
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.\"
.Dd Jan 18, 2017
.Dt VMEM_CREATE 9F
.Os
.Sh NAME
.Nm vmem_create ,
.Nm vmem_xcreate ,
.Nm vmem_destroy
.Nd create and destroy vmem arenas
.Sh SYNOPSIS
.In sys/vmem.h
.Vt "typedef struct vmem vmem_t;"
.Vt "typedef void *(vmem_alloc_t)(vmem_t *, size_t, int);"
.Vt "typedef void (vmem_free_t)(vmem_t *, void *, size_t);"
.Vt "typedef void *(vmem_ximport_t)(vmem_t *, size_t *, size_t, int);"
.Ft vmem_t *
.Fo vmem_create
.Fa "const char *name"
.Fa "void *base"
.Fa "size_t size"
.Fa "size_t quantum"
.Fa "vmem_alloc_t *afunc"
.Fa "vmem_free_t *ffunc"
.Fa "vmem_t *source"
.Fa "size_t qcache_max"
.Fa "int vmflag"
.Fc
.Ft vmem_t *
.Fo vmem_xcreate
.Fa "const char *name"
.Fa "void *base"
.Fa "size_t size"
.Fa "size_t quantum"
.Fa "vmem_ximport_t *afunc"
.Fa "vmem_free_t *ffunc"
.Fa "vmem_t *source"
.Fa "size_t qcache_max"
.Fa "int vmflag"
.Fc
.Ft void
.Fo vmem_destroy
.Fa "vmem_t *vmp"
.Fc
.Sh INTERFACE LEVEL
illumos DDI specific
.Sh PARAMETERS
.Bl -tag -width Ds
.It Fa name
A character string giving a name to the vmem
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arena to be created.
.It Fa base
An address indicating the lowest possible value in the arena.
.It Fa size
The size of the arena to create.
.It Fa quantum
The arena’s
.Dq quantum .
The granularity of the arena.  The amount allocated at minimum by each
request.  Must be a power of 2.
.It Fa afunc
A function which is called to import new spans from
.Fa source ,
which may be
.Dv NULL
if this arena does not import from another.
When calling
.Fn vmem_create ,
.Fn vmem_create
.Fa afunc
is a
.Vt vmem_alloc_t ,
is an
.Vt vmem_alloc_t
a function taking three parameters and returning a pointer to
.Vt void
(the imported space):
.Bl -tag -width Ds
.It Fa "vmem_t *"
The source arena from which we’ll import.  The
.Fa source
argument to
.Fn vmem_create .
.It Fa size_t
The size to import.
The size to import
.It Fa int
The
.Fa vmflag
argument used for the import.
.El
.Pp
When calling
.Fn vmem_xcreate ,
.Fn vmem_xcreate
.Fa afunc
is a
.Vt vmem_ximport_t ,
is an
.Vt vmem_ximport_t
a function taking four parameters and returning a pointer to
.Vt void
(the imported space):
.Bl -tag -width Ds
.It Fa "vmem_t *"
The source arena from which we’ll import.  The
.Fa source
argument to
.Fn vmem_xcreate .
.It Fa "size_t *"
The size of the import.
The size of the import,
.Fa afunc
may
.Em increase
this size if that is desirable, but must never decrease it.
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.It Fa size_t
The desired alignment of the imported space.
.It Fa int
The
the
.Fa vmflag
argument used for the import.
.El
.It Fa ffunc
A function which is called to return spans to
.Fa source ,
which may be
.Dv NULL
if this arena does not import from another.
This is a
.Vt vmem_free_t ,
a function taking three parameters and returning void:
.Vt vmem_free_t
a function taking three parametes and returning void:
.Bl -tag -width Ds
.It Fa "vmem_t"
The arena to which space is being returned.  The
.Fa source
argument to
.Fn vmem_create
or
.Fn vmem_xcreate .
.It Fa "void *"
The span being returned to the source arena.
.It Fa "size_t"
The size of the span being returned to the source arena.
.El
.It Fa source
An arena from which this arena will import,
which may be
.Dv NULL
if this arena does not import from another.
.It Fa qcache_max
Each arena offers caching of integer multiples of
.Fa quantum
up to
.Fa qcache_max ,
which may be 0.
.It Fa vmflag
A bitmask of flags indicating the characteristics of this arena.
.Bl -tag -width Ds
.It Dv VMC_IDENTIFIER
The arena represents arbitrary integer identifiers, rather than virtual
memory.
.El
.It Fa vmp
A pointer to the vmem arena to be destroyed.
.El
.Sh DESCRIPTION
A
.Em vmem arena
is a section of an arbitrary address space (a range of integer addresses).
This commonly represents virtual memory, but can in fact be an arbitrary set
of integers. The
.Dv VMC_IDENTIFIER
flag set at arena creation time differentiates between these two cases.
.Pp
The
.Fa afunc ,
.Fa ffunc , and
.Fa source
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arguments combine to support a hierarchical structure of arenas, each
importing from a single parent (the
.Fa source ) .
The
.Fn vmem_create
and
.Fn vmem_xcreate
functions differ in that the latter provides an interface for
.Fa afunc
to alter the size of the span imported from
.Fa source .
It is only legal to
.Em increase
this size.
.Sh CONTEXT
These functions can be called from user or kernel context.
.Sh RETURN VALUES
Upon successful completion the
.Fn vmem_create
and
.Fn vmem_xcreate
functions return a pointer to a vmem arena.  Otherwise,
.Dv NULL
is returned to indicate the arena could not be created.
.Sh SEE ALSO
.Xr vmem 9 ,
.Xr vmem_add 9F ,
.Xr vmem_alloc 9F
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