Below are the steps to add a new hypercall call to a hypervisor (xen) for ubuntu (32-bit):

1) Open terminal and login as root (*su*)

2) Install Xen

1. *apt-get install xen-hypervisor-i386*
2. *sed -i 's/GRUB_DEFAULT=.*\+/GRUB_DEFAULT="Xen 4.1-i386"/' /etc/default/grub*
3. *update-grub*
4. *sed -i 's/TOOLSTACK=.*\+/TOOLSTACK="xm"/' /etc/default/xen*
5. *reboot*
6. *xm list*

3) Add new hypercall in **bold** to /usr/src/linux/include/xen/interface/xen.h:

```
#define __HYPERVISOR_arch_7               55
#define __HYPERVISOR_goodbyeworld 56
```

4) Add it to entry.S

a) Add to hypercall table:

```
.quad goodbyeworld          /* 56 */
```

b) Add it to hypercall_args_table

```
.byte 0 /* goodbyeworld */ /* 56 */
```

5) Add declaration to /usr/src/linux/arch/x86/include/asm/xen/hypercall.h:

```
long goodbyeworld(void);
```

6) Add implementation in xen/common/domctl.c:

```
long goodbyeworld(void)
{
        printk("goodbye world!");
}
```

7) Add function to call this new hypercall in xen/tools/xc_domain.c:

```
int hypercall_test(int handle)
{
        int rc;
        int arg=0;

        DECLARE_HYPERCALL;
        hypercall.op = __HYPERVISOR_goodbyeworld;
        rc = do_xen_hypercall(handle, &hypercall);
        hypercall.arg[0] = 0;
        hypercall.arg[1] = (unsigned long)&arg;
        return rc;
}
```

8) Write userlevel program (*vi test_hypercall.c*)to call function hypercall_test and invoke new hypercall

```
#include <xenctrl.h>
#include <stdio.h>
int main()
{
 printf("Attempt to invoke the hypercall: __HYPERVISOR_goodbyeworld\n");
 int handle, rc;

 /* Acquire Hypervisor Interface Handle.
 This handle goes as the first argument for the fun.opction do_xen_hypercall()
 */

 handle = xc_interface_open();
 printf ("Acquired handle to Xen Hypervisor:%d\n",handle);

 rc = hypercall_test(handle);
 printf ("Hypercall Details: %d\n", rc);

 xc_interface_close(handle);
 printf ("Hypervisor handle closed\n");

return 0;
```

}

9) Open a new terminal and monitor /var/log/syslog

tail -f /var/log/syslog

10) Compile and run user level program

gcc test_hypercall.c -o test_hypercall

./test_hypercall