

## ✓ Avoid crash on crash report when a bad function pointer was called (#... ...11298)

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If Redis crashes due to calling an invalid function pointer, the ``backtrace`` function will try to dereference this invalid pointer which will cause a crash inside the crash report and will kill the processes without having all the crash report information.

Example:

```
...  
=== REDIS BUG REPORT START: Cut & paste starting from here ===  
198672:M 19 Sep 2022 18:06:12.936 # Redis 255.255.255 crashed by signal: 11, si_code: 1  
198672:M 19 Sep 2022 18:06:12.936 # Accessing address: 0x1  
198672:M 19 Sep 2022 18:06:12.936 # Crashed running the instruction at: 0x1  
// here the processes is crashing  
...
```

This PR tries to fix this crash be:

1. Identify the issue when it happened.
2. Replace the invalid pointer with a pointer to some dummy function so that ``backtrace`` will not crash.

I identification is done by comparing ``eip`` to ``info->si_addr``, if they are the same we know that the crash happened on the same address it tries to accesses and we can conclude that it tries to call and invalid function pointer.

To replace the invalid pointer we introduce a new function, ``setMcontextEip``, which is very similar to ``getMcontextEip`` and it knows to set the Eip for the different supported OS's. After printing the trace we retrieve the old ``Eip`` value.

 unstable (#11298)



**MeirShpilraien** committed on Sep 29

1 parent [f106bee](#) commit [0bf90d944313919eb8e63d3588bf63a367f020a3](#)

Showing 1 changed file with 58 additions and 22 deletions.

[Split](#)[Unified](#)

✓  80  src/debug.c 

1123	1123	}
1124	1124	

```

1125 1125     #ifdef HAVE_BACKTRACE
1126 1126     - static void *getMcontextEip(ucontext_t *uc) {
1126 1126     +
1127 1127     + /* Returns the current eip and set it to the given new value (if its not NULL) */
1128 1128     + static void* getAndSetMcontextEip(ucontext_t *uc, void *eip) {
1127 1129     #define NOT_SUPPORTED() do {\
1128 1130         UNUSED(uc);\
1131 1131     +     UNUSED(eip);\
1129 1132         return NULL;\
1130 1133     } while(0)
1134 1134     + #define GET_SET_RETURN(target_var, new_val) do {\
1135 1135     +     void *old_val = (void*)target_var; \
1136 1136     +     if (new_val) { \
1137 1137     +         void **temp = (void**)&target_var; \
1138 1138     +         *temp = new_val; \
1139 1139     +     } \
1140 1140     +     return old_val; \
1141 1141     + } while(0)
1131 1142     #if defined(__APPLE__) && !defined(MAC_OS_X_VERSION_10_6)
1132 1143         /* OSX < 10.6 */
1133 1144         #if defined(__x86_64__)
1134 1145         - return (void*) uc->uc_mcontext->__ss.__rip;
1145 1145     + GET_SET_RETURN(uc->uc_mcontext->__ss.__rip, eip);
1135 1146         #elif defined(__i386__)
1136 1147         - return (void*) uc->uc_mcontext->__ss.__eip;
1147 1147     + GET_SET_RETURN(uc->uc_mcontext->__ss.__eip, eip);
1137 1148         #else
1138 1149         - return (void*) uc->uc_mcontext->__ss.__srr0;
1149 1149     + GET_SET_RETURN(uc->uc_mcontext->__ss.__srr0, eip);
1139 1150         #endif
1140 1151     #elif defined(__APPLE__) && defined(MAC_OS_X_VERSION_10_6)
1141 1152         /* OSX >= 10.6 */
1142 1153         #if defined(_STRUCT_X86_THREAD_STATE64) && !defined(__i386__)
1143 1154         - return (void*) uc->uc_mcontext->__ss.__rip;
1154 1154     + GET_SET_RETURN(uc->uc_mcontext->__ss.__rip, eip);
1144 1155         #elif defined(__i386__)
1145 1156         - return (void*) uc->uc_mcontext->__ss.__eip;
1156 1156     + GET_SET_RETURN(uc->uc_mcontext->__ss.__eip, eip);
1146 1157         #else
1147 1158         /* OSX ARM64 */
1148 1159         - return (void*) arm_thread_state64_get_pc(uc->uc_mcontext->__ss);
1159 1159     + void *old_val = (void*)arm_thread_state64_get_pc(uc->uc_mcontext->__ss);
1160 1160     + if (eip) {
1161 1161     +     arm_thread_state64_set_pc_fptr(uc->uc_mcontext->__ss, eip);
1162 1162     + }
1163 1163     + return old_val;
1149 1164         #endif
1150 1165     #elif defined(__linux__)
1151 1166         /* Linux */

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1152 1167      #if defined(__i386__) || ((defined(__X86_64__) || defined(__x86_64__)) && defined(__I
1153      -      return (void*) uc->uc_mcontext.gregs[14]; /* Linux 32 */
1168      +      GET_SET_RETURN(uc->uc_mcontext.gregs[14], eip);
1169      #elif defined(__X86_64__) || defined(__x86_64__)
1154 1169      -      return (void*) uc->uc_mcontext.gregs[16]; /* Linux 64 */
1155 1170      +      GET_SET_RETURN(uc->uc_mcontext.gregs[16], eip);
1171      #elif defined(__ia64__) /* Linux IA64 */
1156 1171      -      return (void*) uc->uc_mcontext.sc_ip;
1172      +      GET_SET_RETURN(uc->uc_mcontext.sc_ip, eip);
1173      #elif defined(__arm__) /* Linux ARM */
1158 1173      -      return (void*) uc->uc_mcontext.arm_pc;
1174      +      GET_SET_RETURN(uc->uc_mcontext.arm_pc, eip);
1159 1174      #elif defined(__aarch64__) /* Linux AArch64 */
1160 1175      -      return (void*) uc->uc_mcontext.pc;
1176      +      GET_SET_RETURN(uc->uc_mcontext.pc, eip);
1161 1176      #else
1177      NOT_SUPPORTED();
1162 1177      #endif
1163 1178      #elif defined(__FreeBSD__)
1164 1179      /* FreeBSD */
1165 1180      #if defined(__i386__)
1166 1181      -      return (void*) uc->uc_mcontext.mc_eip;
1182      +      GET_SET_RETURN(uc->uc_mcontext.mc_eip, eip);
1167 1182      #elif defined(__x86_64__)
1168 1183      -      return (void*) uc->uc_mcontext.mc_rip;
1184      +      GET_SET_RETURN(uc->uc_mcontext.mc_rip, eip);
1169 1184      #else
1170 1185      NOT_SUPPORTED();
1171 1186      #endif
1172 1187      #elif defined(__OpenBSD__)
1173 1188      /* OpenBSD */
1174 1189      #if defined(__i386__)
1175 1190      -      return (void*) uc->sc_eip;
1191      +      GET_SET_RETURN(uc->sc_eip, eip);
1176 1191      #elif defined(__x86_64__)
1177 1192      -      return (void*) uc->sc_rip;
1193      +      GET_SET_RETURN(uc->sc_rip, eip);
1178 1193      #else
1179 1194      NOT_SUPPORTED();
1180 1195      #endif
1181 1196      #elif defined(__NetBSD__)
1182 1197      #if defined(__i386__)
1183 1198      -      return (void*) uc->uc_mcontext.__gregs[_REG_EIP];
1199      +      GET_SET_RETURN(uc->uc_mcontext.__gregs[_REG_EIP], eip);
1184 1200      #elif defined(__x86_64__)
1185 1201      -      return (void*) uc->uc_mcontext.__gregs[_REG_RIP];
1202      +      GET_SET_RETURN(uc->uc_mcontext.__gregs[_REG_RIP], eip);
1186 1202      #else
1187 1203      NOT_SUPPORTED();
1188 1204

```

```

1190 1205         #endif
1191 1206         #elif defined(__DragonFly__)
1192         -         return (void*) uc->uc_mcontext.mc_rip;
1207 +         GET_SET_RETURN(uc->uc_mcontext.mc_rip, eip);
1193 1208         #else
1194 1209         NOT_SUPPORTED();
1195 1210         #endif
1951 1966     }
1952 1967 }
1953 1968
1969 + void invalidFunctionWasCalled() {}
1970 +
1971 + typedef void (*invalidFunctionWasCalledType)();
1972 +
1954 1973 void sigsegvHandler(int sig, siginfo_t *info, void *secret) {
1955 1974     UNUSED(secret);
1956 1975     UNUSED(info);
1968 1987
1969 1988     #ifdef HAVE_BACKTRACE
1970 1989         ucontext_t *uc = (ucontext_t*) secret;
1971         -         void *eip = getMcontextEip(uc);
1990 +         void *eip = getAndSetMcontextEip(uc, NULL);
1972 1991         if (eip != NULL) {
1973 1992             serverLog(LL_WARNING,
1974 1993                 "Crashed running the instruction at: %p", eip);
1975 1994         }
1976 1995
1977         -         logStackTrace(getMcontextEip(uc), 1);
1996 +         if (eip == info->si_addr) {
1997 +             /* When eip matches the bad address, it's an indication that we crashed when call
1998 +              * function pointer. In that case the call to backtrace will crash trying to acce
1999 +              * won't get a crash report logged. Set it to a valid point to avoid that crash.
2000 +
2001 +             /* This trick allow to avoid compiler warning */
2002 +             void *ptr;
2003 +             invalidFunctionWasCalledType *ptr_ptr = (invalidFunctionWasCalledType*)&ptr;
2004 +             *ptr_ptr = invalidFunctionWasCalled;
2005 +             getAndSetMcontextEip(uc, ptr);
2006 +         }
2007 +
2008 +         logStackTrace(eip, 1);
2009 +
2010 +         if (eip == info->si_addr) {
2011 +             /* Restore old eip */
2012 +             getAndSetMcontextEip(uc, eip);
2013 +         }
1978 2014
1979 2015         logRegisters(uc);
1980 2016     #endif

```

2079	2115	
2080	2116	serverLogFromHandler(LL_WARNING, "\n--- WATCHDOG TIMER EXPIRED ---");
2081	2117	#ifdef HAVE_BACKTRACE
2082		- logStackTrace( <u>getMcontextEip</u> (uc), 1);
	2118	+ logStackTrace( <u>getAndSetMcontextEip</u> (uc, NULL), 1);
2083	2119	#else
2084	2120	serverLogFromHandler(LL_WARNING, "Sorry: no support for backtrace().");
2085	2121	#endif

0 comments on commit `0bf90d9`

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