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FileName:

SM3.h

Version:

SM3_V1.1

Date:

Sep 18, 2016

Description:

This headfile provide macro defination, parameter definition
and function declaration needed in SM3 algorithm implement

Function List:

- 1.SM3_256 //calls SM3_init, SM3_process and SM3_done to calculate hash value
- 2.SM3_init //init the SM3 state
- 3.SM3_process //compress the the first len/64 blocks of the message
- 4.SM3_done //compress the rest message and output the hash value
- 5.SM3_compress //called by SM3_process and SM3_done, compress a single block of message
- 6.BiToW //called by SM3_compress,to calculate W from Bi
- 7.WToW1 //called by SM3_compress, calculate W' from W
- 8.CF //called by SM3_compress, to calculate CF function.
- 9.BigEndian //called by SM3_compress and SM3_done.GM/T 0004-2012 requires to use
big-endian.

//if CPU uses little-endian, BigEndian function is a necessary call to
change the

//little-endian format into big-endian format.
- 10.SM3_SelfTest //test whether the SM3 calculation is correct by comparing the hash result
with the standard data

History:

1. Date: Sep 18, 2016
Author: Mao Yingying, Huo Lili
Modification: 1)add notes to all the functions
2)add SM3_SelfTest function

#include <string.h>

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#define SM3_len 256
#define SM3_T1 0x79CC4519
#define SM3_T2 0x7A879D8A
#define SM3_IVA 0x7380166f
#define SM3_IVB 0x4914b2b9
#define SM3_IVC 0x172442d7
#define SM3_IVD 0xda8a0600
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#define SM3_IVE 0xa96f30bc
#define SM3_IVF 0x163138aa
#define SM3_IVG 0xe38dee4d
#define SM3_IVH 0xb0fb0e4e

/* Various logical functions */
#define SM3_p1(x)      (x^SM3_rotl32(x, 15)^SM3_rotl32(x, 23))
#define SM3_p0(x)      (x^SM3_rotl32(x, 9)^SM3_rotl32(x, 17))
#define SM3_ff0(a, b, c)  (a^b^c)
#define SM3_ff1(a, b, c)  ((a&b) | (a&c) | (b&c))
#define SM3_gg0(e, f, g)  (e^f^g)
#define SM3_gg1(e, f, g)  ((e&f) | ((~e)&g))
#define SM3_rotl32(x, n)  (((unsigned int) x) << n) | (((unsigned int) x) >> (32 - n))
#define SM3_rotr32(x, n)  (((unsigned int) x) >> n) | (((unsigned int) x) << (32 - n))

typedef struct {
    unsigned int  state[8];
    unsigned int  length;
    unsigned int  curlen;
    unsigned char buf[64];
} SM3_STATE;

void BiToWj(unsigned int Bi[], unsigned int Wj[]);
void WjToWj1(unsigned int Wj[], unsigned int Wj1[]);
void CF(unsigned int Wj[], unsigned int Wj1[], unsigned int V[]);
void BigEndian(unsigned char src[], unsigned int bytelen, unsigned char des[]);
void SM3_init(SM3_STATE *md);
void SM3_compress(SM3_STATE *md);
void SM3_process(SM3_STATE *md, unsigned char buf[], int len);
void SM3_done(SM3_STATE *md, unsigned char *hash);
void SM3_256(unsigned char buf[], int len, unsigned char hash[]);
int SM3_SelfTest();

```